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"A STEP in the right direction," is the way in which Commissioner Clements of the Interstate Commerce Commission dismisses the report of the Hadley securities commission. He is speaking before the house committee of interstate and foreign commerce favoring a bill to authorize the I. C. C. to make an investigation of the value of all stocks and bonds of all common carriers in the United States. We must assume that Commissioner Clements has not read the securities commission's report. If Mr. Clements had really read the report he could not have failed to follow the clear deductions made by five men, who certainly possess rather more than the average degree of intelligence, so entirely as to say that this report was a step in the right direction and in the same breath ask authority to do the very thing that the report showed conclusively that it was absolutely impossible to do. When Mr. Clements is asked if the Hadley commission did not investigate the same subject he now wants the I. C. C. to investigate, he answers, "Yes"; but apparently the trouble is that they did not definitely determine the value of all railway bonds and stock of all common carriers. If E. H. Harriman had been able to determine the value of all the stocks and bonds issued by all the common carriers in the United States, he might, we may be quite sure, have died worth $800,000,000 instead of $80,000,000.

IN arranging to take formal concerted action on the demands made by the locomotive enginemen, the Eastern railways are making a most important step. Heretofore there has not been in the East any such harmony of action between the different managers as there has been in the West when labor questions came up. Even in 1910 the managers did not work together when the conductors and trainmen virtually acted as a unit in negotiating for increased wages in Eastern territory. Such individual adjustments as have been made in the past have been not only less satisfactory to each railway at the time, but have resulted in variants of wage scales which now give any union a wide field from which to choose for each class of service the highest rate any road pays, and take these maxima as its basis in submitting a scale to apply to all roads. Something of this condition is evident in the demands which the enginemen have now presented. The committee of managers is collecting and tabulating in such form as to be accurately studied figures showing what on each road would be the result of the proposed scale. And, particularly, it is making public the facts of the questions at issue. The experience with the western shopmen has been a striking example of the value of publicity when relations between employees and managers are to be adjusted, and in this case the roads are determined that the public shall be accurately and promptly informed at each step in the negotiations.

OUT of 73,354 stockholders of the Pennsylvania Railroad, a return just made shows that 34,712—almost one-half—are women. The last returns of the kind, some two years ago, of the New York, New Haven & Hartford, closely correspond with those of the Pennsylvania, and show that out of approximately 16,000 stockholders 7,200, or 45 per cent., are women. The figures as they stand, which are more or less typical of the feminine stockholding in any steady railway dividend payer, especially in the older states, are striking as a proof of the extent to which a large dependent class holds interests in our conservative railways. And it is a dependent class in two senses: financial and mental. As a class it not only needs the dividend but must rely on the judgment of others in making an investment as well as in selling it out. Where there is one woman who watches her stocks and bonds herself there are probably 20 who rely on the advice of others. Woman, moreover, as a stock owner, has temperamentally a trait that exposes her to the larger investment risk. In her is peculiarly developed that psychological tendency that prompts her to "hold on" to an investment by the mere force of habit. It is hard for her—much harder than for a man—to realize that a regular dividend payer, often inherited with a parental stamp of confidence, has become a speculative risk. That such a class, largely outside of self-protection, has acquired so great holdings in railways is surely a fact that ought to make the man who attacks railway revenues stop and think. Nor are the returns that are cited complete. They do not include railway bonds, in which women have interests probably larger in proportion than in stocks; they do not include the trusteeships holding railway securities and so often appointed for women exclusively; and they

do not include the minor males under guardians and trustees, who in the protective relation are obviously to be classed with women. If such could be grouped with the women stockholders in such a corporation as the Pennsylvania, the exhibit would be yet more impressive.

THE development in railway terminal facilities for handling iron ore on the Great Lakes, referred to in an editorial in the *Railway Age Gazette* of January 26, in connection with a description of a large loading dock, is still further emphasized by the description of the largest unloading dock ever built on the lakes, which is given elsewhere in this issue. The load for which this structure was designed and the condition encountered in the filled land on which the dock was located made it necessary to support the substructure on piles. The problem presented in this work is comparable to that met constantly in the construction of heavy bridge abutments, piers and similar structures requiring pile support. The use of concrete piles for such foundations seems to be growing in favor as satisfactory methods of constructing, handling and driving them are worked out and become more widely understood. The advantage of greatly increased life under adverse conditions which concrete piles possess in comparison with wooden ones has been recognized for some time, but the problems involved in their use, such as the design of reinforcement to prevent shattering during handling and driving, and the securing of a suitable cushion or driving block to prevent serious battering of the pile head, have deterred some engineers from using concrete. The engineers in charge of the Cleveland dock both for the railway and for the contractor planned the details of this work very carefully and conducted a number of tests during its progress to confirm their judgment and experience. A very complete casting and curing plant was laid out, a satisfactory driving block was found after a number of trials, and the tests for shattering showed that the reinforcement was serving its purpose well. The methods used and the results secured should be of considerable interest to engineers interested in foundation work.

EXPERIENCE with steel passenger cars in accidents is accumulating rapidly, and the conclusion must be that their construction is well justified. Their behavior in severe collisions shows them to be not invulnerable; but their resistance under such destructive impacts has not been a disappointment to the builders, who understand the limitations of the strength due to shape and to materials. A correspondent in our issue of February 16 refers to the failure of the steel sleeper in the Chicago, Milwaukee & St. Paul accident at Odessa, and aptly remarks that this does not necessarily imply weakness in steel construction of passenger cars, but that the superstructure was sheared off because the strong steel underframe of the dining car was lifted above that of the sleeper and was necessarily converted into a huge shear. He also refers to the familiar examples where the front ends of locomotives (which represent a form of very strong steel construction which we can hardly hope to attain in the upper frame of passenger cars) have been sheared off by collision with other engines, or by rocks, and even by the wooden sills of freight cars. If passenger cars are made very strong by the use of steel construction they become a valuable protection to the passenger in many forms of accidents like those due to derailments, and when cars are rolled over, as in a recent accident on the Pennsylvania. When account is taken of the relative protection afforded by steel and wooden cars during the period in which the former have been in use it will doubtless be found that the steel car has demonstrated its valuable qualities; and unquestionably its construction will be continued in universal numbers. The federal requirement of steel postal cars for the protection of the mail clerks at the head of fast trains is of itself a strong recognition of the superiority and safety of steel construction.

REPORTS ABOUT RAILWAY "GRAFTING."

THE reports of alleged grafting in connection with the construction of and the purchase of equipment for the Chicago, Milwaukee & Puget Sound, which have been given such widespread publicity recently, suggest two reflections. One is that railway officers should at all times be frank and candid in giving to the public facts about their business which can properly be made public. The second is that they should reduce to a minimum the number of facts about their business which they do not feel can properly and safely be made public.

The reports regarding the Chicago, Milwaukee & Puget Sound were very indefinite. They merely indicated that the road had bought supplies from concerns with which relatives of officers of the Chicago, Milwaukee & St. Paul, the parent line, were connected. Now, that a railway officer has relatives in the railway supply business, and that supplies for his road are bought from them, is, in itself, of no consequence or significance whatever. Grafting in connection with purchases consists in so making them as to defraud the road; and there is no graft in purchases made without fraud, whether from a relative or anybody else.

In the circumstances, the wise course for the management of the Chicago, Milwaukee & St. Paul to have taken would have been to have bluntly and candidly told all of the facts. President Earling did not do this. The first report said that he had a relative who was the head of a railway "equipment" company. Mr. Earling denied this, using the word "equipment" as it is technically understood by railway men; that is, as applying only to cars and locomotives. The fact was promptly published—a fact which was widely known—that he has a son-in-law who is prominently connected with railway supply concerns with which the St. Paul and its subsidiary, the Puget Sound, have done business. The newspapers and their readers promptly jumped to the conclusion that Mr. Earling had not been candid, and, putting, of course, the worst possible construction on this, have since discounted every statement he has made; and not only the St. Paul but all railways have been injured by the reports. Some day, let us hope and pray, all prominent railway men will learn, as many have learned, that the best way to create a favorable public opinion regarding railways is to deal frankly and courageously with the public, and that the very best way to create a suspicious and hostile public opinion is to deal with the public in a different way.

Rumors about railway grafting are constantly in circulation, and relate to more roads than one. Whence and why do they originate? The *Railway Age Gazette* believes that railway managements and railway officers in general are as honest and honorable as the managements and officers of other business concerns. Never was a more powerful searchlight of publicity turned on any other business than has poured its rays on that of American railways during the last ten years; and that so few facts seriously reflecting on the honor and honesty of managements and officers have been disclosed is a tribute to the integrity of the great majority. Could any other business, manufacturing, mercantile or newspaper, or any profession, have stood such a crucial test equally well?

Yet these reports about grafting persist, and the reasons for them deserve serious consideration. In the first place, not a few prominent railway officers have relatives in the railway supply business. The relatives of railway men, like other people, have a right to engage in any business that they like; and there are so many high railway officers whose honesty makes them "lean backward," as the saying is, in dealing with supply houses with which their relatives are connected that this condition, which is always public, probably exerts comparatively little improper influence on purchases. But doubtless it does sometimes influence purchases; and when two or more supply houses compete for an order, and one with whom some relative of one of the road's officers is identified gets it, it is apt to be said by representatives of the rival concerns that the purchases were not made on a business basis, whether there is any ground for the charge or not. This is one of the sources of grafting reports.

Again, a considerable sprinkling of railway officers own stock in railway supply concerns. This does not necessarily lead to the giving of orders to these supply concerns on improper or dishonest terms; but there is no doubt that, being usually secret, it does sometimes have this effect. The notorious frauds in the Illinois Central began in exactly this way. Those concerned in them finally became so reckless, and so hungry for dishonest gain, that they organized a car repair concern of their own, so that they might not have to divide the graft with outside stockholders. The reputations of railway officers generally would be safer, and those who now own stock in supply concerns would subject themselves to less temptation, if those who own such sock would get rid of it. It is hard for any man to serve two masters, and one who holds a railway office which gives him influence over purchases, and owns stock in a supply concern, is bound to be under more or less temptation to serve himself at the expense of the railway which is paying him a salary to serve it only. Even if he does not yield to the temptation his dual connection is likely to give rise to evil and injurious reports about him.

Then, again, there are a few railway officers here and there who accept expensive presents from railway supply men, such as gold watches, automobiles, gowns for their wives, etc., which they know are not given solely out of love and affection, or for philanthropic reasons. And there are even some who buy supplies at excessive prices and divide the excessive part of the prices with the supply concerns from which they are bought, or who accept cash for exercising favoritism in placing orders. Also, there are one or two supply men who get considerable business through habitually losing at poker when playing with railway men. Railway men and supply men assert that these things occur, and give the names of the men and even the amounts involved. They also tell us in circumstantial detail of attempts at blackmail and bribery in connection with the purchase and sale of supplies. The supply men that give the graft and the railway men that receive it usually think that no one suspects them. If a number of them were aware of the detail in which their dishonest transactions are bruited about, and of the evil reputations that they bear where they think they stand best, they would be very much surprised and pained, if not alarmed.

The foregoing indicates clearly enough why reports regarding grafting are constantly in circulation—reports often false, but sometimes true, which hurt the innocent, who are in the great majority, as well as involve the guilty.

It would be a work of supererogation to point out wherein the evil of actual grafting consists. It is simply one form of stealing; and stealing is just stealing, no matter what form it takes. While comment on the morals of such dealings is superfluous, some suggestions as to why it is expedient to stop them will not be amiss. Because of the prevalent attitude of public opinion toward railways, it is more than ever necessary that, if the roads are to get fair treatment from the public, they must be able to convince the public that they are honestly and economically managed. Every disclosure of wholesale grafting, such as those in the comparatively recent Illinois Central and Chicago & Western Indiana cases, and every such report, whether false or true, which appears to have some foundation, tend to make the public believe that the roads are neither economically nor honestly managed—an opinion which as to most of them is very unjust. Most executive officers feel more keenly every day the need for getting and maintaining the management and operation of the properties above suspicion, and are, therefore, making ever greater efforts to keep out dishonesty and to detect and stop it wherever it is found. In consequence, if the grafters will not heed the voice of morals, which tells them that grafting is wrong, they should heed the voice of expediency, which is constantly telling them in louder and louder tones that the danger of getting caught and exposed, and perhaps prosecuted criminally, is steadily increasing.

One of the worst effects of transactions in connection with the buying and selling of supplies which are actually fraudulent, or which are open to misconstruction, is one to which we have alluded already, viz., that when reports about them get into circulation, instead of hurting the reputations merely of those who are dishonest, they create the impression that crooked transactions are common and general, thereby besmirching the names of that great majority of railway men and supply men who are honest.

In view of existing conditions, and of the reports that constantly are getting into circulation, it would seem that the need for greater efforts to avoid not only evil, but the appearance of evil, should be clear to every railway man and supply man. That the conditions that cannot be defended shall be cleaned up, and that those that can be defended shall be defended candidly, courageously and incessantly—these are the two things it is necessary to do in order to create a favorable public opinion regarding railways. As long as either of them is not done by the responsible managements, the agitation and public animosity against them will be constantly reviving, and if they do continue to revive it will be mainly the managements' own fault.

THE INDUSTRIAL RAILWAY SITUATION.

THE attention of railway executive and traffic officers and of regulating authorities is particularly called to the extracts from the testimony of Milton H. Smith, president of the Louisville & Nashville, in the case of the Manufacturers' Railway of St. Louis, against the St. Louis, Iron Mountain & Southern, et al, which are published elsewhere in this issue. It is not practicable to print the whole of Mr. Smith's testimony, for it fills 160 pages of stenographer's notes. His observations on railway conditions, the relation of rates to competition and rates for the development of industries are of great interest, but we have been obliged to confine our extracts to those relating directly to the important question of allowances to industrial railways and their bearing on unfair discrimination.

The *Railway Age Gazette* repeatedly during recent years has called attention to the fact that unfair discrimination is not dead, nor even sleeping, but is still alive and very much awake, numerous evidences of which may be found by those who will seek them in the published tariffs. Mr. Smith has candidly and forcibly called attention to one existing form of discrimination. He pronounces many of the allowances now made to industrial railways illegal, and declares the continuance of many unfair arrangements is due to the use of the boycott by large shippers to whip into line railways that do not give them the unfair concessions that they demand; to excessive competition between the roads themselves, and to "incompetent management of railways." In an editorial in our issue of February 9, page 227, we mentioned the heroic means the Interstate Commerce Commission has adopted in one case to put a stop to the giving of excessive divisions of rates to an industrial road in the Southeast, as an example of the way in which the commission sometimes tries to help the roads free themselves from certain of their embarrassments. The testimony of Mr. Smith is a good example of what railway men may do to help the commission to remedy bad existing conditions.

At the first hearing in the Manufacturers' Railway case, after testimony had been given for that railway, counsel for the trunk lines let the case go to the commission without testimony from their side. Perhaps this was because officers of the individual roads feared to tell what they thought and knew lest the result would be retaliation by the Anheuser-Busch Brewing Association in the giving of its traffic; and the explicit statement by George F. Moore, president of the Manufacturers' Railway, in his recent testimony (See *Railway Age Gazette*, February 16, page 269), that "the line that paid the allowance would get the business if there was not any hope for reparation," shows that such fears were not without justification. The course of the railways at the previous hearing was a mistake—an indefensible, but not unprecedented, mistake. Their officers not infrequently have shown similar pusillanimity in dealing with big shippers. The error made at the former hearing has not been repeated at

the second one. No one can read Mr. Smith's testimony without learning that here is a railway executive officer who has the courage and wisdom to tell the truth as he sees it about the existing relations between the trunk lines and industrial railways, even when his conception of what is the truth makes it necessary for him to say that some of these relations are criminal. It is to be hoped that the Louisville & Nashville is not the only road which dares introduce testimony in this proceeding, but that, on the contrary, all the railways concerned will do so and will seek to get a decision from the Interstate Commerce Commission which will establish correct principles regarding the allowances which the railways may and may not pay to industrial railways. And it is to be further hoped that when the commission has established these principles the railways all over the country will have the good sense to live up to them.

THE INTIMATE STORY OF A STRIKE BILL.

AT Trenton, N. J., on Tuesday last, there was a public hearing before the Senate Judiciary Committee on two bills introduced by State Senator Fitzherbert "by request." The exposure of the crudely attempted hold up in connection with these bills should be of widespread interest to railway men, notwithstanding the fact that the bills themselves had almost no chance of passing and in any case affected only a comparatively few roads.

At the judiciary hearing it was claimed a representative of the Commercial Acetylene Company was approached by a Dr. Ridner and told that certain legislation would shortly be introduced in the New Jersey legislature that would very much hurt the acetylene company. Ridner offered to put a stop to anything that might be done. When pressed for details he later showed a typewritten copy of a bill which would prohibit railways from using acetylene on any of their trains in New Jersey, and apparently would forbid its use even for lighting stations. The acetylene company refused to do anything until the bill was actually introduced, and shortly after this a bill claimed to be identical with the one shown by Dr. Ridner was introduced. A typewritten draft of a second bill was brought to the same representative of the acetylene company which prohibited the manufacture of acetylene within 2,000 ft. of any building, road, factory, etc. Some of the provisions were so absurd as to make its passage in any legislature wholly unlikely. Later, however, a modified form of this second draft was introduced as Senate Bill 110 by the same senator who had introduced the other acetylene bill.

Both bills were referred to the Judiciary Committee and a public hearing was given on Tuesday. Senator Fitzherbert claimed that he had known nothing of the hearing until Tuesday morning. Attorneys for the Central of New Jersey and the Delaware, Lackawanna & Western were there as was also Mr. Ostby of the acetylene company. Senator Fitzherbert said the bills had been given him by someone, and made a mumbled explanation that he had heard somewhere that acetylene might be dangerous in railway wrecks. When asked for details he confessed to knowing nothing. He was the only advocate of the bill.

Mr. Ostby then told of the visits of Dr. Ridner and of how, eventually, he had named a price of $1,500 to kill both bills. Two witnesses and a stenographer were secretly present at this interview and the stenographer had taken down parts of the conversation. This was on February 13.

On Saturday, February 17, a New York *Evening Sun* reporter got an appointment with Senator Fitzherbert himself, claiming that he was a friend of Mr. Ostby. The interview was at Fitzherbert's house at Dover, and the *Sun* reporter told Fitzherbert that while the Commercial Acetylene people were willing to pay to have the legislation stopped, they wanted to deal with someone more reliable than Dr. Ridner. He asked Fitzherbert if he himself would not take $5,000 and divide it up so that the legislation would be stopped. Fitzherbert said that Ridner was a good man, and at first refused to handle the money himself. Later, however, the *Sun* reporter claims that he agreed to do it for $5,000.

Mr. Ostby then told the committee that on the night before the hearing he and the same *Sun* reporter saw Fitzherbert in Trenton on the pretext that Mr. Ostby wanted to try and beat him down from the $5,000 to something nearer the original $1,500 mentioned by Ridner. Failing to do this, Mr. Ostby said that he promised to get the $5,000, and that Fitzherbert agreed to accept it and kill the bill.

Fitzherbert in "defending" himself, after Mr. Ostby had told his story, acknowledged that both the Dover and Trenton interviews took place in substance as described *except* that he (Fitzherbert) did not agree at either time to accept any money himself, but that he simply told the reporter or Ostby to go to the backers of the bill and offer them the money, and that he said he thought they would accept it. He acknowledged, however, that the sum of $5,000 had been mentioned.

This case is flagrant, but in its underlying essentials not unlike many which railway officers are confronted with. A few such cases publicly exposed would clear the atmosphere and teach the constituents of legislators something. A railway officer can make out a case as strong as the one we have described if he will follow it through, and he should do so, not only in the immediate interest of his company, but for the sake of his own self respect and the health of the body politic.

IMPORTANT BRIDGE DEVELOPMENT IN THE SOUTH.

THE construction of a bridge across as large a river as the Mississippi or Ohio is of interest at any time, and especially so when across the lower Ohio, or the Mississippi below Cairo. The statement was given out during the past week that negotiations are practically completed for a bridge to be built across the Ohio river near Paducah by the Chicago, Burlington & Quincy, the Louisville & Nashville, the Chicago & Eastern Illinois and the Illinois Central. This followed closely the announcement that the Chicago, Rock Island & Pacific plans to construct a bridge across the Mississippi at Memphis. These announcements indicate the importance of the development promised in north and south routes in connection with the completion of the Panama canal. The small number of such important routes at present and the difficulties of such bridge construction across the lower Mississippi are indicated by the absence of such structures. The Cairo bridge of the Illinois Central is the only crossing over the Ohio river below Evansville, Ind. The present Frisco bridge at Memphis is the only structure now crossing the Mississippi river south of Cairo, and, with the exception of the Thebes bridge, completed seven years ago, is the only bridge crossing the river in the 800 miles south of St. Louis, in marked contrast to the number of crossings north of this point. Because of the heavy outlay required in the construction of such a bridge, car ferries are operated on the lower Mississippi at several important points where a large amount of traffic is handled, as at Vicksburg, Baton Rouge and New Orleans.

One of the conditions imposed by the government for bridges crossing these rivers is a long channel span averaging about 700 ft. in length. The principal traffic on the lower Ohio and Mississippi consists of fleets of coal barges from the Pittsburgh district. These fleets are hard to manage, and even with long spans across the channel accidents frequently occur, resulting in the fleet breaking up. For this reason the navigation interests are insistent in demanding long spans. Also because of the volume of navigation on the Ohio and lower Mississippi all bridges are built enough above high water to pass the largest steamers in order to eliminate draw spans. As the variation in level between high and low water is great, especially on the Ohio, a high and expensive substructure and expensive approaches are required. South of Cairo the annual flood period is prolonged, as the Ohio floods occur earlier than the upper Mississippi and Missouri floods, thus introducing their special construction difficulties below Cairo.

One of the serious difficulties encountered on bridge work on the lower river is the absence of the rock foundations found further north, making it necessary to base the structure on the alluvial strata. The Frisco bridge at Memphis rests on water tight clay 150 ft. deep, underlaid with an indefinite depth of saturated sand and gravel. The piers for this bridge extend 96 ft. below low water line, while the foundations of the Cairo bridge extend 75 ft. below low water.

The present Frisco bridge was built by the Kansas City, Ft. Scott & Memphis in 1882, and affords entrance into Memphis for all the roads coming from the Arkansas side, including the Frisco, the Rock Island, the Iron Mountain and the Cotton Belt. The demand for the construction of the Paducah bridge originated with the extension of the Burlington to Metropolis, Ill., two years ago, and the inauguration of through freight service between St. Louis and southern points by way of Metropolis and the Louisville & Nashville. The Illinois Central has maintained a car ferry at this point a number of years. It is understood that this road has now become a party to the construction of the bridge, and will do away with the ferry. The construction of these new bridges across the Mississippi and Ohio will be watched with much interest by railway men because of their part in the opening of new southern routes, and also because of the engineering difficulties which will be encountered.

PERE MARQUETTE.

THE difficulties of making a good financial showing for the Pere Marquette in the fiscal year ended June 30, 1911, were, apparently, insurmountable. These difficulties are the result of the past history and financing of the road and of its physical location, and to the fact that, competing with other roads on through traffic, notably the Michigan Central, it is at a great disadvantage. In 1907 the road was put into the hands of a receiver, after the breakdown of its affiliation with the Cincinnati, Hamilton & Dayton. Quite inadequate sums had been spent for upkeep, and the receiver found it necessary to make considerably larger expenditures for maintenance. The company was reorganized in December, 1907, under the direction of J. P. Morgan & Co., and put directly in charge of William Cotter, who had been the road's general manager under the receiver.

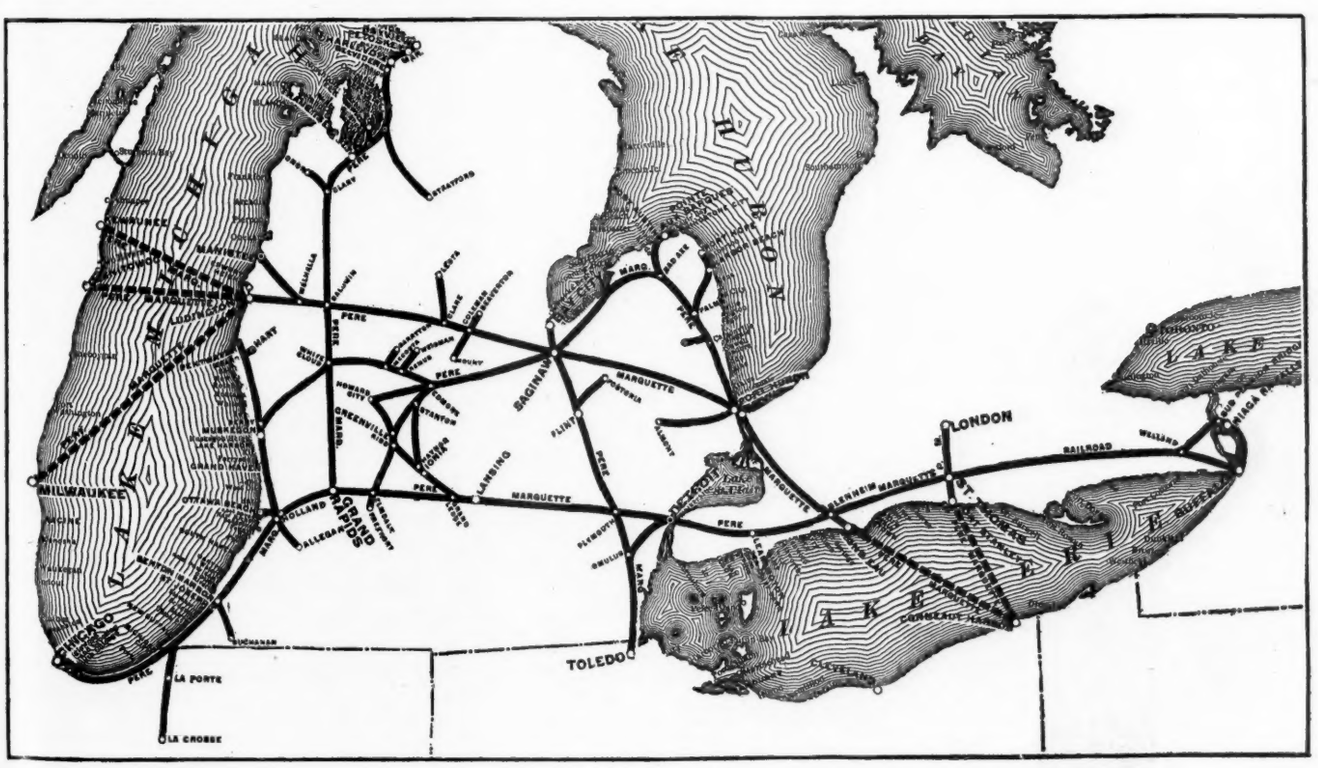
While the property had been improved physically, and important operating economies had been carried out, the reorganization, from the financial standpoint, was not drastic and the company was left badly in need of money.

The Pere Marquette operates over 2,000 miles of line in Michigan and has trackage rights which give it a connection both with Buffalo and with Chicago. For through traffic, however, between these points, it has to compete not only with the Michigan Central and the Lake Shore and other roads, but labors under the disadvantage of having no eastern connections nor any western connections. To have the faintest hope of competing for through business, service must be high class and, therefore, expensive. On the other hand, the Pere Marquette has a very considerable mileage in Michigan through thinly populated territory where, although it has no competition, it has such a light traffic that the operating ratio on these lines is high.

As an independent and competing road, with its present capitalization, it is not at all surprising that in the fiscal year ended June 30, 1911, the company showed a deficit, after the payment of interest and rentals, of $1,800,000. This deficit was due to very slightly smaller gross revenues, an increase of $1,770,000 in operating expenses, an increase of $194,000 in interest and rentals, and an increase of $427,000 in the net cost of hire of equipment.

Freight revenue in 1911 was less by $366,000 than in the year before and totaled $10,766,000. Passenger revenue, on the other hand, was greater in 1911 than in 1910 by $232,000, and totaled $3,939,000.

While the average length of haul per ton of freight remained almost the same in 1911 as in the previous year, and the average revenue per ton per mile decreased only from 5.91 mills in 1910 to 5.79 mills in 1911, the number of tons of revenue freight carried was less by 181,000 tons and totaled 10,346,000 tons. The two most important decreases in tonnage of freight were due to a falling off of 105,000 tons in the tonnage of products of forests and to a falling off of 133,000 tons in the tonnage of manufactures carried. Of the total tonnage of the Pere Marquette products of mines in 1911 furnished 39.31 per cent.; products of agriculture, 17.79 per cent.; products of forests, 14.59 per cent.; manufactures, 10.74 per cent.; merchandise, L. C. L., 7.99 per



Pere Marquette.

cent.; miscellaneous, C. L., 7.20 per cent., and products of animals, 2.38 per cent.

Mileage and traffic statistics show that it was through no fault of the operating department that a deficit was shown in 1911 as compared with a small surplus in 1910. The number of tons of revenue freight per loaded car was 17.84 in 1911, as against 17.83 in 1910. The average revenue train load was 320 tons in 1911, as against 323 tons in 1910. With a decrease in tonnage carried, there was a corresponding decrease in the miles run by loaded freight cars, but a rather large increase in empty freight car mileage, due presumably to traffic conditions and the falling off in tonnage of commodities, the tonnage of which commodities had heretofore helped to balance traffic.

Figures for passenger business bear out the comments of Mr. Cotter that the passenger business in Michigan has been increased on the Pere Marquette not because of any stimulus given it by the Michigan two-cent fare law, but by additional service put on by the road. Passenger revenue totaled $3,939,000, an increase of $232,000; and the number of passengers carried amounted to 5,745,000, an increase of 112,000; the average haul remaining about the same in 1911 as in 1910. The mileage run by passenger cars, however, totaled 17,632,000, or 987,000 miles more in 1911 than in 1910.

The increase in passenger car and train mileage, together with the wage increases for trainmen, etc., explains the considerable increase in cost of transportation. In 1911 transportation expenses totaled $7,292,000, an increase of $921,000 over 1910. Despite, however, the increases in these expenses, apparently no attempt was made to make a good showing at the expense of proper upkeep. Maintenance of way and structures cost $2,123,000 last year, an increase of $191,000; and maintenance of equipment cost $2,551,000, an increase of $433,000. Even now the standard of maintenance is not high on the Pere Marquette, although as is quite evident, fully as high as the earning power of the road will at present justify. About 108 miles of main track were laid with new rails, mostly 75-lb. section. There were a little over 200 ties used in renewals per mile of main track.

The annual report of the company gives a very straightforward, simple statement of what has been done in the way of improvements, too numerous to go into here, but which show that very careful attention is being given to increasing the efficiency of the plant.

The Pere Marquette has put in telephone circuits for train despatching between Detroit and Grand Rapids, Ludington and Saginaw, and Grand Rapids and Porter. This, together with the mileage heretofore equipped with telephones for train despatching, makes a total of 562 miles so operated.

At the beginning of the year the company was badly in need of money. During the year $8,000,000 5-year 6 per cent. collateral trust notes of March 1, 1911, were sold at a discount of 5 per cent. The company used $4,549,000 of the proceeds of this note sale to pay maturing obligations and to pay off its floating debt which, at the beginning of the year, amounted to $1,550,000. It also spent $1,900,000 for improvements, among which may be mentioned 37 miles of double track between Alexis and Romulus; change of line between Alfred and Union Pier, about six miles, which eliminated 360 deg. of curvature and reduced the grade from 0.9 per cent. to 0.5 per cent.; began work on a new 43-stall roundhouse at Grand Rapids and a 20-stall roundhouse at Saginaw, converting the old roundhouse at Grand Rapids into a boiler, tank and blacksmith shop.

At the end of the year the company had on hand $1,915,000 cash working capital and no loans and bills payable. However, on July 1, 1912, there are $5,000,000 Pere Marquette debentures due, and on March 1, $650,000 equipment notes due. The debentures are provided for under the $60,000,000 improvement and general refunding mortgage, but the company would still have to find a market for the improvement bonds, of course.

It would seem that the solution of the Pere Marquette's difficulties would probably be worked out by its becoming affiliated with some other railway company. At present its control, it is understood, is held either by J. P. Morgan & Co. directly, or by George W. Perkins, who is chairman of the board, and who was until recently a member of the Morgan firm. It has been rumored that Newman Erb has been negotiating for its purchase with the object of consolidating it with some of the other lines in which he is interested. Whether or not these negotiations have been carried out it is not definitely known. A study of the map of the property readily suggests that while, as an independent line, without adequate credit, it could not be considered a very valuable property, it might be for some other connecting road a quite valuable investment.

The principal figures for operation in 1911 as compared with 1910 are as follows:

	1911.	1910.
Mileage operated	2,368	2,365
Freight revenue	$10,765,545	$11,131,076
Passenger revenue	3,939,391	3,707,311
Total operating revenue	16,523,762	16,542,271
Maint. of way and structures	2,123,297	1,932,437
Maint. of equipment	2,550,859	2,117,700
Traffic expenses	467,790	420,298
Transportation expenses	7,292,092	6,370,632
Total operating expenses	13,470,965	11,698,842
Taxes	664,770	755,641
Operating income	2,388,027	4,087,788
*Gross corporate income	1,981,927	4,070,968
Net corporate income	†1,813,761	‡469,713

*In both 1911 and 1910 hire of equipment debt more than offset other corporate income.

†Deficit.

‡Surplus.

NEW BOOKS.

Electric Traction and Transmission Engineering. By Samuel Sheldon and Erich Hausmann. New York: D. Van Nostrand & Company. Illustrated. Cloth, 307 pages, 5½ in. x 7¾ in. Price, $2.50.

Professor Sheldon is well known as the author of two books on Dynamo Electric Machinery, which have been so well received that an eighth edition has been found necessary. The present volume has equal merit, being one of the best books on the engineering of electric traction thus far published. While intended primarily for the university student, it will be found useful to the practicing engineer who is well grounded in the mathematics relating to his profession. The treatment is remarkably concise, and this feature has been carried to such an extreme limit that it will bear some amplification in future editions. This could be accomplished without increasing the size of the volume by the use of smaller type, a slightly closer spacing and, perhaps thinner paper. The portion relating to electric locomotives is, perhaps, too brief. The author has wisely avoided any suggestion of bias in favor of any particular system of electric traction, but has clearly described the characteristic of each, leaving the reader to select that which seems best adapted to his purpose. The use of hyperbolic functions in connection with problems relating to transmission lines is clearly explained and their application illustrated by examples. The book attempts to present a perspective view of the design of a complete railway installation from the cars to the power station, to indicate the nature and sequence of the various problems thus involved, and to suggest and illustrate methods for their solution. It is unusually well printed, and the numerous diagrams are remarkably clear and satisfactory in every way.

The first six chapters relate to cars and their equipment, tractive effort and train resistance, motor characteristics, speed curves and motor control. There are three chapters on the distributing system, substations and transmission lines, and the concluding chapters relate to power stations, steam and hydraulic. There is little descriptive treatment of specific forms of apparatus or structures, as the aim has been to explain principles and laws, and to illustrate them by numerical problems.

Letters to the Editor.

RAIL FAILURES AND CAR TRACK DESIGNS.

PITTSBURGH, Pa., February 19, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Much has been said lately in newspapers and technical journals regarding the character of rails and the reason for rail failures. In an editorial on page 267 of the *Railway Age Gazette* of February 16, 1912, it was stated that the Lehigh Valley rail was not subjected to excessive wheel loads, citing 28,000 lbs. as the maximum engine wheel load, and loads on car wheels much less than that. With no apology for defective rails, such as the Lehigh Valley rail was found to be, the writer would like to call attention to conditions that exist today on all railways having modern freight equipment.

A 50-ton capacity car weighing 45,000 lbs., carrying a load of 110,000 lbs. has a total weight of 155,000 lbs. on the wheels, or 77,500 lbs. on each truck. Such a car carried on the usual center bearing truck with side-bearings located about in line with the wheels is often seen rocking from side to side after having passed over a rough place in the track, such as a high or low joint or a frost heaved section. This rocking or rolling is very noticeable in a train of cars having high bodies with their consequent high centers of gravity, each car rocking in the opposite direction from the one next to it. The rocking is produced by a change in elevation of the wheels on one side of one truck, relative to the plane of the track under the remainder of the wheels. Such a change causes the load to be transferred from the center plate to the side-bearing on the high side of the track, compressing the truck springs by the excessive load. The spring recoil throws the car body back and over to the other side bearing, compressing the truck spring underneath it. Such a motion when it has been started is at times accelerated by unavoidable track conditions until derailment occurs; but, disregarding such extreme cases an analysis of the stresses set up by the alternate transfer of the load from side to side shows very heavy wheel loads.

The 77,500 lb. truck load referred to above is the static load, which when thrown from side to side places the whole of it alternately on each side bearing and on the two wheels in line with the side bearing. The M. C. B. class D group of springs is compressed solid with a load of 64,000 lbs., and the impact due to solid contact may double or quadruple the static load and cause each wheel to strike the rail with a blow of from 75,000 to 150,000 lbs. Nor is this all—a train of 50 cars repeats this blow 200 times in passing a given point. Should we marvel then that rails break, or that wheel flanges fail?

The railways and car builders have gone on year after year increasing the load in the car, from a 10-ton car of a few years ago until now 50 tons is the common load, and 60, 70, and in some cases 100 tons are handled with the consequent increase in the height of its center of gravity. What have we done with the car truck to take care of the changed conditions? It is a Chinese copy, in principle, of the trucks for 10-ton cars, increased in weight but disregarding the effect of tossing such loads from side to side.

We want rails made of the best material, and every care taken to discard defective ones, but the chief fault is in the rolling stock. The hammering blows from side to side are wholly unnecessary and can be prevented by a truck design which will carry the car over our worst twisted and uneven track without rocking the car, and without concentrating its load on half of the wheels. It can be done. It is done in a simple and effective manner. There are trucks in use under rigid body construction carrying 50-ton loads and distributing the load over all of the wheels all of the time. Why not relieve the cause instead of attempting to "strengthen up" in an endeavor to take care of the effect? Change truck specifications. E. W. SUMMERS.

SUGGESTED MODIFICATION OF RULE NO. 210.

SAN FRANCISCO, Cal., January 30, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

It is generally admitted that the present method of handling trains by telegraph is cumbersome, and, with the increase of traffic, a cause of serious delay. The train wire is so congested that considerable of the time of operators is lost watching for a chance to report trains, and frequently reports are held back until the despatcher calls for them. It is impossible for a despatcher to do good work unless his record of trains is kept close up. Otherwise he must work without information that would be valuable to him in making meeting points.

Rule No. 210 reads:

"When a 31 order has been transmitted, operator must (unless otherwise instructed), repeat it from the manifold copy, in the succession in which the several offices have been addressed, and then write the time of repetition on the order. Each operator receiving the order should observe whether the others repeat correctly."

I suggest that the rule be modified to read as follows:

"When a 31 train order has been transmitted, operator designated by the despatcher will repeat it at once from the manifold copy. Other operators receiving the order will closely observe the repetition, so as to detect any error. When the order has been repeated by the operator designated, each operator, who has been required to copy the order, shall, in the succession in which the several offices have been addressed, give the train or trains to which the order is addressed at their station, and give O. K. with name of operator copying the order."

The same modification would also apply to Rule No. 211. The advantages to be derived would be very considerable. At present when an order is sent to four offices, each operator is required to repeat it; which in the case of a schedule order frequently requires twenty to thirty minutes and in many cases longer. All other work on the train wire is at a stand still, the despatcher loses close touch with trains and a congestion results that it frequently requires hours to relieve.

I do not think we would sacrifice any element of safety by adopting the modification suggested, but on the contrary would add to it; and I feel sure that we would increase the efficiency of the despatcher 100 per cent.

Under Rule No. 210 as it now reads it is expected that all operators to whom the order is sent will listen to the various repetitions for the purpose of noticing any errors. It is well known to most of us that very little attention is given to the repetition of orders by others, each operator depending on the despatcher to insure correctness in his copy. When the responsibility is put on an operator he will know his copy is correct before signing and giving O. K. for an order.

I do not know that I would recommend this modification of rules except on track equipped with automatic block signals. The railways of this country have spent millions of dollars in the construction and maintenance of block signals, and while great benefits have been derived from them I feel we have not made as much use of signals as we are justified in doing in the operating of trains. DESPATCHER,

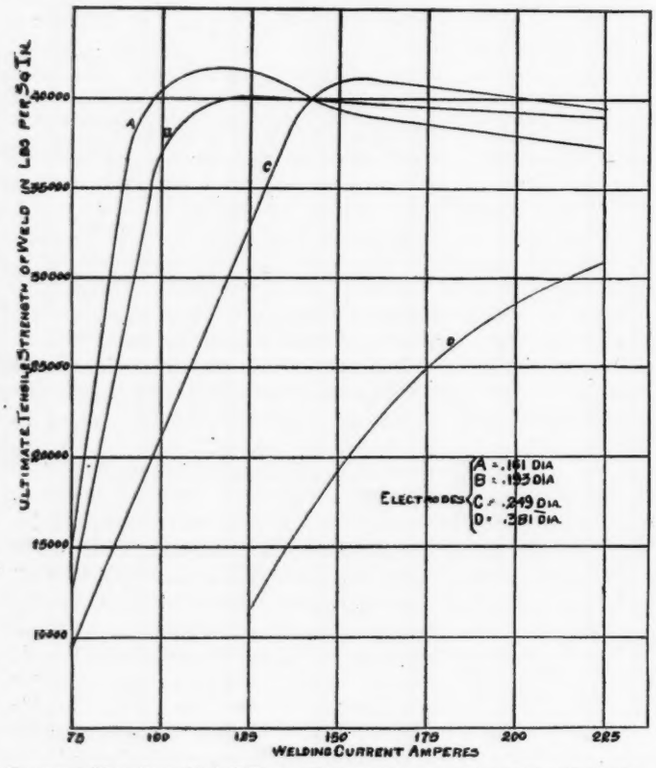
Southern Pacific Company.

A supplementary contract has been made to the original Avalos-Keilhauer Railway contract of June 3, 1908, which provided for the construction of a railway from La Union, in Salvador, to connect with the Guatemala Railway, at some point on the Guatemalan frontier. It is understood that the arrangements entered into by this supplementary contract have eliminated certain objectionable features which the contract of 1908 was considered to contain. The new contract provides a new method of meeting the payments of the subvention of $11,000 per mile, which was granted in the original contract, and makes various modifications regarding the collection of wharfage by the contractor, and the construction of fences along the railway.

ELECTRIC WELDING.

In a paper presented before the New York Railroad Club, Friday, February 16, O. S. Beyer, Jr., of the mechanical department of the Erie Railroad, spoke of the uses of electric welding in railway work. The resistance type of electric welding has its greatest application in the industrial field, but may be used to good advantage in certain cases of railway work. It consists of clamping the two pieces firmly together and passing an electric current through the joint, the resistance of the joint creating sufficient heat to do the welding. This system is used in railway work for welding rails together by means of two fish plates located one on each side of the web at the joint, and in welding certain parts of steel passenger cars. It could also be successfully used in spot welding the Russia iron engine jackets on locomotives.

The arc type of welding uses the electric arc for the heating. There are three methods used in this system; one of them consists of jumping an arc between two carbon electrodes and pull-



Curves Showing the Effect of Current on Strength of Weld.

ing the arc to the portion to be welded by a magnetic flux which acts similar to an ordinary blow pipe. The repair material is placed in the weld as chips and fillings, or is applied with a metal pencil, the heat of the arc melting and fusing it to the object to be welded. The second method is drawing an arc between the material to be repaired and a carbon electrode, fusing the materials as in the first case. This latter method, however, tends to make the weld hard and brittle, on account of the carbon that is carried into it from the carbon electrode. This method has been used in steel mills and foundries to some extent, but has not been found very practical in railway work. The third method in arc welding is that of making the repair material the electrode. In this way particles of the electrode are fused and carried to the part to be welded and by hammering intermittently a good solid weld is procured.

This new method was first introduced by Slavinoff, whose system required large current, reaching in some cases as high as 4,000 amperes. A modification of this system was perfected by Siemund in Germany and is known as the Siemund-Wenzel electric welding process. The current never exceeds 150 amperes and usually ranges between 120 and 130. This tends to make the melted particles very small, detaching themselves in a rapid stream and following the arc and adhering to the spot on the work over which the arc comes. This method of electric welding has found very successful application in the repair of locomotive fireboxes, mud rings, machinery parts, wheel centers, tires, iron and steel castings, and many similar parts. Broken flue sheet bridges and complete sets of flues have been welded with success. The following table gives the comparative costs of working with this system and by following the usual methods of making the repairs:

Locomotive Parts Repaired.	Cost by Electric Welding.	Cost of Usual Method.
Two locomotive frames	$11.80	$56.20
Driving wheel tire gouged to a depth of 3/16 in.	.72	8.00
*Cracks in side sheets of firebox	66.51	342.62
Hole in knuckle joint of parallel rod	.75	7.50
*Cylinder casting	22.65	367.15
Spoke in driving wheel	3.38	4.58
Mud ring as shown in illustration, 74 cu. in. of metal added	32.07	118.06
*Side sheet seams in firebox	56.40	777.18
*Cracks in firebox	22.11	800.68
*Valve rod guide key-way	.83	5.53
Rocker arm crack at bosses	2.93	6.13
Cracks in cylinders	2.90	3.50

*These parts would have had to be replaced.

Note.—The last five items were taken from an article on Electric Welding in Railway Shops by Mr. Beyer in the February issue of the *American Engineer*.

A claim that the saving on boiler work for this process or any other process of autogenous welding is the difference between the cost to renew the sheets and the cost to do the welding is not just. At best the welding has prolonged the life of the sheets a year or two, possibly. The repaired parts are not equal to brand new parts.

Complete sets of flues have been welded to the back flue sheets of several engines and the engines have been returned to service. Close observation of these engines indicates that the work in the engine house to keep the flues tight is considerably reduced. Three months' service of a few engines is too short to look for ultimate results. The indications, however, are that by the use of electric welding in flue applications, a step in advance in boiler construction and maintenance has been made. Add to this what will be gained by electrically welding all firebox and mud-ring seams, while the boiler is being built, and the proper maintenance of locomotive boilers may be considerably simplified from its present perplexing state.

DESCRIPTION OF PROCESS.

The following description of the Siemund-Wenzel process is taken from the February issue of the *American Engineer* in preference to the one used in the Railroad Club paper.

"It employs direct current supplied at potentials of 20 to 30 volts at the arc and 50 to 80 volts at the generator terminals. One lead of the welding circuit is attached to the welding clamp which holds the welding material—pencil or electrode. The current is furnished by a generator usually direct connected to a motor, properly wound for the current and line voltage available at the place of installation.

"An electric arc about 3-16 in. to ¼ in. long is sprung between the welding material or pencil and the object to be repaired. The voltage is regulated until the current is of the proper amount to suit the work in hand. The spot on the surface of the object being welded, where the electric arc strikes, is instantly brought up to a state of incipient fusion, and minute molten particles of the pencil or electrode detach themselves progressively in a continuous rapid stream, and, following the arc, attach themselves securely at the spot where the arc strikes. This proceeds very uniformly until either the arc is interrupted or a sharp fluctuation in current takes place.

"About every minute or so the actual welding operation is stopped while the operator subjects the local heated area of the

weld which he is making to rapid blows from a small hand hammer. The object of this is primarily to force out any minute portions of oxide or slag that may have formed due to the presence of impurities or improper manipulation. It is also done with the object of working the metal of the weld, and to close up any small pin holes that may have formed. The repairing material is applied until the chipped and V'd out portion is entirely filled up, and then an additional amount is applied for reinforcement. This works out very satisfactorily since the additional material added adheres as securely as the material which is part of the direct weld, and thus serves to reinforce in direct proportion to the section of the material added. Consequently there is no reason why a weld thus reinforced cannot be made as strong, or even stronger, than the original material. In practice it is found desirable to reinforce welds of this nature sufficiently to make their tensile strength about equal to the tensile strength of the original material.

"The arc and the molten particles of material are guided by a magnetic flux which originates in the electrode holder. The welding current is led around the handle of the holder through a heavy series coil in such a way that a strong magnetic current is set up which travels through the pencil and in the direc-

Mud Ring Defect Repaired with 74 Cu. In. of Material.

tion of the arc. The presence of this magnetic current assists greatly in causing a very rapid deposition of the repairing material and makes overhead welding possible and perfectly practical. Without this magnetic current, overhead welding could not be done with any degree of certainty as to the results. The magnetic current also increases the strength of the weld owing to its concentrating influence and the cooling effect on the arc. It prevents oxidization of the molten particles while in transit and the formation of slag and pin holes that sometimes form in the weld.

"The welding pencil consists of a very pure grade of Swedish iron of a definite cross sectional area. It has been determined by careful laboratory research that the quality of the repairing material and the pencil diameter have a decided influence on the properties of the weld. A definite relation exists between the size of the pencil, the amount of the current, and the tensile strength of the weld. Hence the quality of the material and the size of the pencil must be carefully selected."

The curves *A*, *B*, *C* and *D*, which are reproduced from Mr. Beyer's paper before the New York Railroad Club, shows the effect of the current on the strength of the weld made with electrodes 0.161 in., 0.193 in., 0.249 in., and 0.38 in., in diameter. The current must be just right for each size of electrode, for if too great it will over heat both the particles and the work and burn them. If it is too small the particles and the work will not be hot enough to make a good weld. The operator will find it easy to determine the proper current.

Mr. Beyer in the *American Engineer* article stated that:

"In order to prevent oxidation and the consequent formation of slag, and also to provide certain ingredients which affect the welding material chemically and so benefit it physically by making it soft and ductile, the welding pencil or electrode is covered with a flux. When the welding operation is carried on, the flux melts and vaporizes, enclosing the molten particles and the arc to the exclusion of atmospheric oxygen which attacks the repairing material in its fused state, and thus improves the quality of the weld."

DESCRIPTION OF APPARATUS.

The following description of the apparatus is taken from the *American Engineer* article:

"The electric welding installation consists of a motor generator set, the necessary control apparatus, measuring instruments and protective and steadying resistance. The motor generator is provided to convert the standard current available into direct current at voltage suitable for welding. Hence the motor may be either of the direct or the alternating current type. The generator is wound to furnish a maximum constant output of 200 amperes direct current at a range in potential of 50 to 80 volts. This range in voltage is secured by varying a resistance in series with the field circuit. A variable rheostat for this purpose is mounted on the slate switchboard so that it may be conveniently manipulated by the operator.

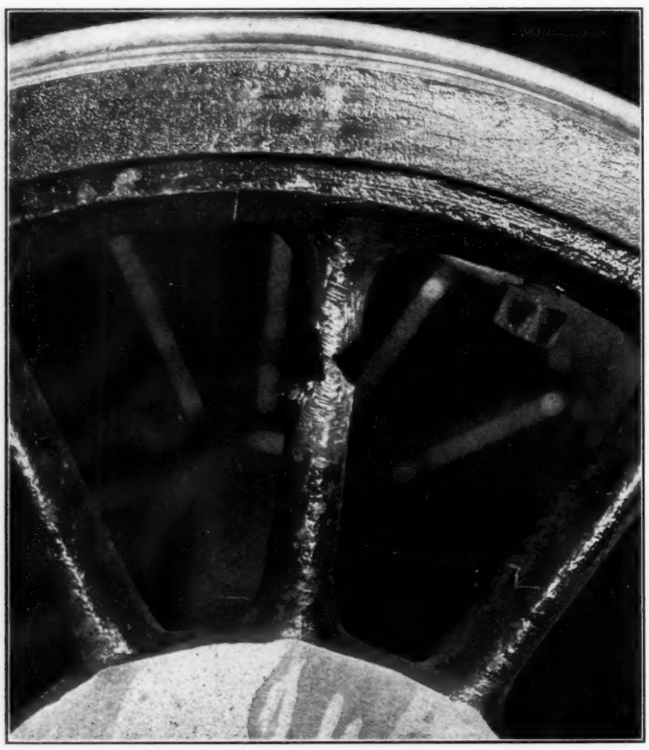
"A second resistance is placed in one leg of the welding circuit in such a position that when the generator is short circuited at the instant of striking the arc the resistance acts as a protection to the armature and commutator of the generator by limiting the maximum current possible at a maximum voltage to the greatest permissible instantaneous overload capacity of the generator. Another resistance is provided which is automatically thrown in series with the above resistance and across the terminals of the generator the instant the welding arc is interrupted. Together these two resistances serve as a secondary or temporary load on the generator when the welding operation has ceased. The instant the welding is started again, this latter resistance is automatically cut out. These two resistances are so proportioned that the load which they impose upon the generator equals the load imposed upon the generator when the welding operation is under way. In this way violent fluctuations of the load on the motor generator are avoided. Furthermore, this particular arrangement results in the best welding work. The closer the regulation is maintained and the more constant the generator voltage is, the less the likelihood of pin holes and defects being found in the weld.

"An ammeter and a voltmeter, which are both connected to the welding circuit, are mounted on the switchboard. These instruments serve the purpose of indicating the amount of current and the voltage of the welding circuit. The welding clamp or holder consists of a wrought iron handle, properly insulated, around which is wound a coil. This coil in turn is insulated from the hand by a leather covering. To one end of the coil is attached one of the leads of the welding circuit; the other end of the coil is attached to the holder near the base of the clamp. The clamp consists of a projection from the holder and a piece of spring steel, so fastened together that the combination serves to hold the welding pencil or electrode rigidly. The entire welding outfit is mounted on a substantial base, which is made up of standard rolled steel sections. For the machines now being built, this base is of cast iron with suitable projections on the back to which are fastened the banks of resistance which are part of the installation. The slate switchboard with its terminal lugs, fuses, switches, motor starting box, electrical measuring instruments, contactors and relay, is mounted on an angle

iron frame securely fastened to the bed of the motor generator set and the machine housings. In this way a firm and compact arrangement is secured. The outfit should be surrounded by a rail to prevent accidents.

"An electric welding installation, such as described above, is capable of furnishing sufficient electricity for one welder at a time. The welding lines are brought from the switchboard to any place desired in the shop. In fact, a main, or several main welding circuits may be installed throughout the shops with occasional taps so arranged that it is only necessary to attach limited lengths of flexible welding cables to the main circuit at the taps and run these to the places where the welding work is to be done."

Discussion.—The discussion at the New York Railroad Club's meeting was rather brief and was opened by a statement covering the wide range of the work that can be done by electric welding and the savings effected by it. In general terms it was claimed that where the apparatus could be kept busy all of the time the saving would average at least $500 a month. In the use



Cracked Driver Spoke Ready for Welding.

of the resistance system of welding, its value as a means of welding girder rails in street railways was commended. The joints so produced generally are impossible to detect. Welds were made in rails where the flanges were broken away from the end of the rails and the tops were so closely drawn and held together that the actual joints could not be found. The work held until the rails were so worn that they were renewed. The formation of the joint is such that the only essential point in making it is to have the heads of the abutting rails in contact. Under working conditions these points are in compression and the welding bar is in tension and this has ample strength to sustain the imposed stress.

Information was asked regarding the methods to be used in welding locomotive frames. Attempts at this kind of welding had been generally unsatisfactory although some claim it can be done successfully. In this work the frames are subject to intense heat for a long time which burns and oxydizes the metal and though the outer surface may seem sound and in first-class condition, the interior is generally rotten. It would be interesting to have some of the locomotive frame welds cut up to determine the condition of the interior. It has been found that where large sections are handled the metal was sound and homogeneous to a depth of an inch or so, but that below it was bad. This flowing-in process, however, could probably be successfully used to build out flat spots on steel wheels and thus avoid the expense and loss of metal due to turning.

Attention was called to the character of the metal which was cast. It could not be called cast iron because it lacked the amount of carbon characteristic of that metal. Nor could it be classified as cast steel as ordinarily known because it did not have the same structure and yet its structure was that of a cast metal and any work put on it in the way of hammering would be for its improvement. It was claimed that by using an electrode of high carbon steel that strength of the weld would be increased. The method of welding tubes in the sheet shown by the author was criticised. He showed a bead built up about the projecting end of the tube and serving to fasten that projection to the tube sheet, a ferrule being used as usual. It is well known that the bead on a tube is the most troublesome part of its anatomy, and, so why perpetuate it where it is unnecessary? It was suggested that a better plan would be to set the tubes with their ends flush with the face of the tube sheet, dispense with the ferrule and weld direct to the sheet. This had been done with notable success on some Mallets for western roads.

The question was asked as to the method of consecutive procedure necessary for the welding-in of tubes in order to avoid a distortion of the sheet by expansion, whether it were best to work from the center outward, or from the outside circle in towards the center or in vertical or horizontal lines. The author stated, in reply, that owing to the localization of the heat no trouble was experienced from expansion and that no special order of procedure was necessary in order to insure success. It was acknowledged that the electric arc could not compete with the oxy-acetylene flame for neatness of the work of cutting or the speed with which it could be executed.

The railway from Arica, Chile, to La Paz, Bolivia, is nearing completion. This is the third railway connecting La Paz to the coast, and it will probably be completed in about five or six months. It was planned to open the road in November, but the construction work was seriously interfered with by unusually heavy rains, which washed away two large bridges and several miles of embankments. The road in operation will place La Paz within 12 miles of Arica, which is considered one of the finest and safest ports on the western coast of South America. The other two routes, Mollendo and Antofagasta, take 32 and 40 hours, respectively, to reach the coast from La Paz. The direct route from Arica to La Paz has made it necessary to use the cog system for several miles where the grade is steepest, and also to go to an altitude of 14,105 ft., making it one of the highest railways in the world. The effect of the quick ascent and great altitude on people having weak or abnormal hearts is to be counteracted by having oxygen compartments in the passenger cars. Passengers subject to mountain sickness or heart weakness may occupy the oxygen compartments, in which they will have in the air they breathe the same proportions of oxygen as at sea level. It is expected that the new line will be more popular for passenger than for freight service. It is said that the excessively steep grades will make the transportation of freight very expensive, considerably more so than by either of the other two lines, notwithstanding their much greater length. In connection with the Arica-La Paz line there is now before the Bolivian congress a proposition to construct a line 150 miles from Cochabamba to the Chimore river, which is a tributary of the Amazon. From the terminal point on the Chimore steamers will ply to Guayaramerin, a distance of about 600 miles, which can be made in 72 daylight hours. Guayaramerin is a port on the Mamore river in eastern Bolivia, and from that point is now being constructed and nearly completed a railway of 180 miles to Puerto Viejo.

RAILWAY REGULATION.*

BY WALTER L. ROSS,

Vice-President, Chicago & Alton and Toledo, St. Louis & Western.

There has been less wrongdoing on both sides of this question of equitable regulation of traffic than there has been a muddying of the water, brought about by selfish desire of each of us to bring our own particular interest to the top.

Not such a long time ago I attended a gathering of a national organization that is handling, or attempting to handle, some of these great problems, in which we are all so vitally interested. Through all the meeting there ran this one note: Railway men, representatives of the great transportation interests, should be more friendly. They should get closer together. Now, that is something that I have always preached. In my own poor, weak way I have tried to practice it as well. And sometimes we railway men have gotten so close together that it has required the crowbar of a national or state board of railway commissioners to pry us loose. But this is another story.

This body did not adjourn without passing resolutions. No perfectly organized body of American citizens, no matter for what purpose organized or assembled, does that. In substance, this particular set of resolutions called upon each member of this particular organization to go home and petition his congressman and his senators for the passage of a proposed federal law. This law in substance was to prevent the appeal to the interstate commerce commission of any rate or traffic problem until it had first been passed upon by the state railway commission and the supreme court of the state in which the legal question had arisen. Another fine example of merely muddying the water, instead of looking for a clear and definite solution.

We should have regulation. And that regulation cannot be too rigid or exacting. But there should be some central point where the men whose money and energy is tied up in transportation can get final decisions, that "will stay put." We should be relieved of the cross-fire from a multiplicity of state boards. This is the age of the wireless telegraph, the hogless lard and the cowless butter. If we could only have a politicianless regulation of the transportation business most of us would heave a sigh of profound relief.

Hampered as it has been I believe that our interstate commission has done much effective and beneficial work. And because of the honest and efficient work of present and past members of that board we are today much nearer a permanent solution of these questions than we have ever been before. But the final and definite solution of all these matters would be expedited by the complete cutting off from the regulation of all traffic problems of the politicians.

Adequate regulation is a fine thing, and much to be desired. But with a political bias it is dangerous to the business of the country. In the first place, the politician, pure and simple—if any of them are pure and simple—does not know anything about the actual, practical elements of the business with which he is trying to deal. And in the second place, his mind is generally fixed upon re-election.

What we want is not less regulation, but more. But it should be along much broader lines than ever before. The commission represents all the people. The government should be in a position to get the very best expert knowledge that is to be found in the transportation, legal and business circles of the country. To that end the appointments should be substantially for life, and the salary should be fixed at such a point that the men holding them would feel free to make a lifelong study of the question. Transportation, legal and business experts should all have a place on this commission.

So far as possible I believe in the elimination of state boards, so far as rates and classification, and rules and orders affecting the same are concerned. Cut out the sentiment, and substitute clear cut business sense. Behind the establishment of most of these state boards there have been more of state pride and state sentiment, than of reason and logic. Within proper limitations, "state rights" is a most excellent thing. Carried to an extreme, at one time, it threatened the life of this nation itself. As it operates in the establishment of state regulating boards for the transportation industry it too often leads to confusion, bad feeling and lack of confidence, rather than to the permanent settlement of any question.

The absolute control of transportation by state boards in any equitable and substantial manner is impossible, because the authority of such boards is confined within arbitrary and artificial boundaries. The development of business and traffic in this country has given absolutely no recognition to state lines. And because of that very fact this country has continued to grow rich and great.

The broadened and strengthened national commission might carry with it recognition of the various states in its makeup. Or more logically in the geographical distribution of its membership it might recognize the natural great trade territories and sections of the country. The natural development of the country has clearly marked out what these trade territories, having common trade and traffic interests, really are. And the transportation industry of the country has attempted to serve these territories justly and equitably, by the establishment of voluntary associations, covering the scope of country that is naturally united by the trade and traffic of the country. These voluntary associations you will recall as including the Central Freight Association, the Trunk Line Association, the Western Trunk Line Association, the South Eastern Association and the Transcontinental Association. And these associations have served not only the interested lines, but they have done great and substantial service to the territories traversed by those interested lines. Such divisions are the natural result of traffic and trade following the lines of density of traffic. Any regulation which seeks to ignore them, as state regulating boards must do, will fail to meet the actual necessities of the case.

But one central, national commission, on the broad lines that I have so briefly sketched, could unify the rates and classifications, and establish one set of rules and regulations and orders for all.

In all this, let me emphatically repeat that there is neither criticism nor fault finding with the commission as at present organized. It is my firm belief that they are doing great and good work, and should have the hearty support and commendation of shippers and railways alike. It is a herculean task at best, and I have no sympathy with the shipping organizations, the state commissions, the industrial shippers or the railways, that try to block progress, and muddy the waters by a cry of state's rights.

It really matters but little where, or upon whom, the authority or responsibility finally rests for the solution of these great questions, coming up from day to day. But, wherever that authority is placed, it must be concentrated in one body, protecting state and national interests alike. Personally I favor the centralization of all this power to decide matters in the hands of a national or interstate commission, so organized as to assume such responsibility. Then the working out of a fixed policy, free from politics.

This would produce more stability and an absolute knowledge of "where we are at." We do not need more laws, or more legal advice half as much as we do the uniform enforcement of such laws as we already have. In spite of all the confusion, good has come in a large measure from such regulation as we have had in the past. I have always been taught to believe that it is never wise to destroy, or tear down, until we can suggest something better.

And even then we should use judgment and common sense in the introduction of the new. There should be no haphazard work. On a western school board a member one time solemnly introduced the following resolution: "Resolved, That we build

*Abstract of an address before the Traffic Club of Philadelphia, February 17.

a new school house; and resolved that we use the material out of the old house to build the new one, as far as it will go; and be it further resolved, that we continue to use the old school house until the new one is completed and ready for occupancy."

We can hardly be as conservative as that, but in the construction of a new and central regulating authority let us hold on to every good thing in our present methods that our experience has demonstrated to be productive of the best results.

In common with the majority of practical railway men I have never looked with favor upon the proposition of government ownership of railways. And yet, after a recent visit to the government owned and operated road in the Panama canal zone, my belief along those lines was jolted just a little. Our government owns a railway there that is fifty miles in length. It is a profitable road. It cleared one and one-half millions last year.

And I found that it had a blanket freight rate of $2.25 per ton, without regard to distance carried, or classification of commodity. Lumber and silk, one mile or ten, it is all the same; the uniform rate of $2.25 per ton applies to all. Not so bad, at that. I doubt whether there is any privately owned road in this country that would seriously object to the establishment of such a rate by our interstate commission. Which incidentally has nothing to do with the road on the canal zone.

Along various lines, here and there, legislation might be strengthened to advantage. I believe that too many safeguards to life and property cannot be thrown about the proper, speedy and safe transportation of both persons and property. And among other things, legislation everywhere should more clearly define the criminal responsibility of employees who fail to carry out orders. The recent tragic wreck on the Illinois Central, and other unfortunate occurences of recent date, only too strongly emphasize this necessity. The laws on this point should be both plain and stringent.

Conditions must be maintained and created that will give the railways the money to carry on this development. There is only one source where they may obtain that money—it is from the people. The great capitalists are really the people. No dollar is so timid, however, as that of the great body of the people in time of panic or unrest. There must be no regulation that will discourage the dollar from doing its duty in the development of this common country of ours. Idle capital and silent industries mean idleness for all the nation. The people's money is willing to assist in the vitally essential upbuilding of our increasing requirements. It depends upon us to encourage or discourage our neighbors to invest, for new investment means new business and added activities. They create for us national facilities, absolutely essential for our future development.

In anything that I have here given utterance to, there has not been the slightest desire to criticize our government in its efforts to bring about an equitable regulation of the transportation problem. My only desire has been to point out these conditions for consideration and thought. And to them to add the further consideration that our honorable commissioners should be continued as regulating body.

The reports of the last year filed with the Interstate Commerce Commission I think clearly indicate that there is a necessity for greater earnings upon the part of the railways. The actual conditions support the contentions that the roads have been making for better earning power.

Upon the prosperity of the roads, upon their ability to meet conditions in the coming years, depends the further development and expansion of this country. It is a great problem. But the same forces that have made the American railway what it is today, are still on the job. We have made mistakes in the past. We need not repeat them in the future. The regulation of this great industry is necessary. It should be as broad and far-reaching as the industry itself. The genius of the American people is ample to evolve the proper regulation and control. Such regulation and control must fail if it is based upon *my* interests. It will succeed if it be based upon a just consideration of *our* interests—all of us.

SIBLEY (MO.) BRIDGE OF THE SANTA FE.

A bill has just been passed through both houses of Congress and approved by the President permitting the lowering of the clearance line 2 ft. under the three main channel spans of the new bridge which the Atchison, Topeka & Santa Fe is now constructing across the Missouri river at Sibley, Mo. This revised clearance line gives 48 ft. clear head room above the record high water of 1844 and a greater clearance than this above the standard high water line adopted by the United States Army Engineering department.

Beginning at the west end, the present bridge consists of one 80-ft. deck girder span, one 200-ft. deck truss span, three through truss spans, 396 ft. center to center of end pins, one 247-ft. deck truss span, two 172-ft. 6 in. deck truss spans and about 2,000 lineal feet of steel viaduct composed of 30-ft. towers and 60-ft. intermediate spans. In the reconstruction work the west abutment and pier No. 1 will be remodeled and the 80-ft. deck girder will be renewed. The 200-ft. deck truss span will be replaced with two 100-ft. deck girder spans resting on a new center pier and the three 396-ft. through truss spans will be replaced with spans of the same length. From 8 to 20 ft. of the masonry will be removed from the tops of the piers of these spans and replaced with concrete. The three deck truss spans and the 2,000 ft. of steel viaduct will be renewed, the piers under the spans being remodeled, as necessary, to fit the new steel work. All piers in the main channel of the river rest on bed rock, while the piers under the east approach viaduct will be based on reinforced concrete piles, the tops of which will stand about 12 ft. above the extreme low water line.

The new structure is designed for Cooper's E-60 loading. The entire bridge will have a ballast deck with a foot-walk and hand-railing on one side. All telegraph, telephone and signal wires will be carried across the bridge on steel brackets placed on the down stream side.

While the bridge is being rebuilt as a single track, gauntlet tracks will be laid, the rails in each pair being placed 7 in. apart on centers. The 0.8 per cent. grade now existing on the east approach viaduct and for about two miles further east will be reduced to 0.5 per cent. by raising the shore end of the viaduct and the fill beyond.

In designing the viaduct it was necessary to adopt span lengths such that the new piers would in all cases miss the old ones, the masonry in these old piers being badly shattered and worn out, due both to faulty design in the bottom of the metal columns and to the lack of pile supports. One interesting feature in connection with the new viaduct is the placing of genuine expansion bearings on one bent in each tower, this bearing being made of four 12-in. segmental rockers. The work of replacing the 396-ft. spans is now well under way. Somewhat over half of the steel work for these spans is already on the ground at the bridge site and it is planned to begin the erection of the west span early in February.

The steel work is being furnished by the American Bridge Company, while the Missouri Valley Bridge & Iron Co., of Leavenworth, Kan., has the contract for remodeling the four large piers, building the false work, taking down the old spans and erecting the three new ones. It is planned to contract the sub-structure work for the approach viaducts, while the steel work will be erected by company forces.

The cost of this rebuilding is estimated at about $1,300,000. It is expected that the bridge will be finished by the end of the present year, although high water or other unfavorable conditions may delay this somewhat. This work is being done under the supervision of A. F. Robinson, bridge engineer of the system, and C. F. W. Felt, chief engineer.

A concession to build and operate a railway from Embarcacion, Argentina, to Yacuiba has been granted. The gage on this line is to be 3 ft. 1 in.

PENNSYLVANIA ORE UNLOADING DOCK AT CLEVELAND.

The present ore handling facilities of the Pennsylvania Company in the city of Cleveland are located on a branch of the Cuyahoga river on what is known as Whiskey island. This property is south of the main line of the Lake Shore & Michigan Southern, which parallels the lake, the channel from the lake to the docks being very crooked and being spanned by three bridges, one of which is the single track swing bridge carrying all the main line traffic of the Lake Shore & Michigan Southern and the dock business of the Pennsylvania. This condition has made the movement of boats to the dock very tedious, requiring the services of one or two tugs. The track facilities were so limited that a very large amount of switching was necessary in order to handle the business.

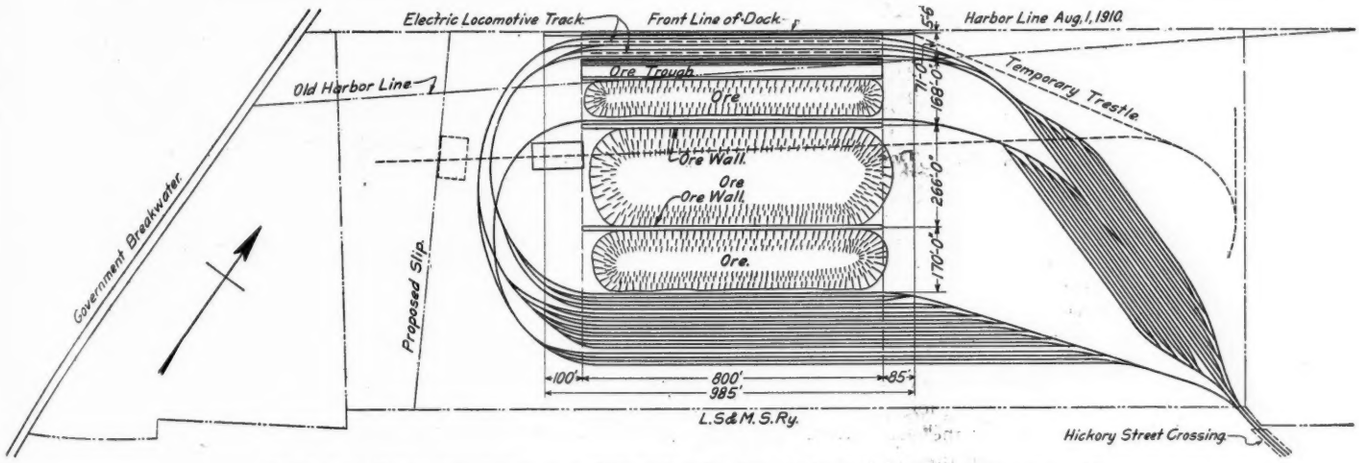
For the above reasons the Pennsylvania decided to develop property which it owned on the lake front, known as the west breakwater. It was necessary to reclaim about 40 acres of land by filling with slag and other refuse collected on the Cleveland and Pittsburgh division and to build a dock, foundations for ore unloaders, and bridge, power house, a complete yard and a double track subway under the line of the Lake Shore & Michigan Southern.

FILLING FOR THE DOCK SITE.

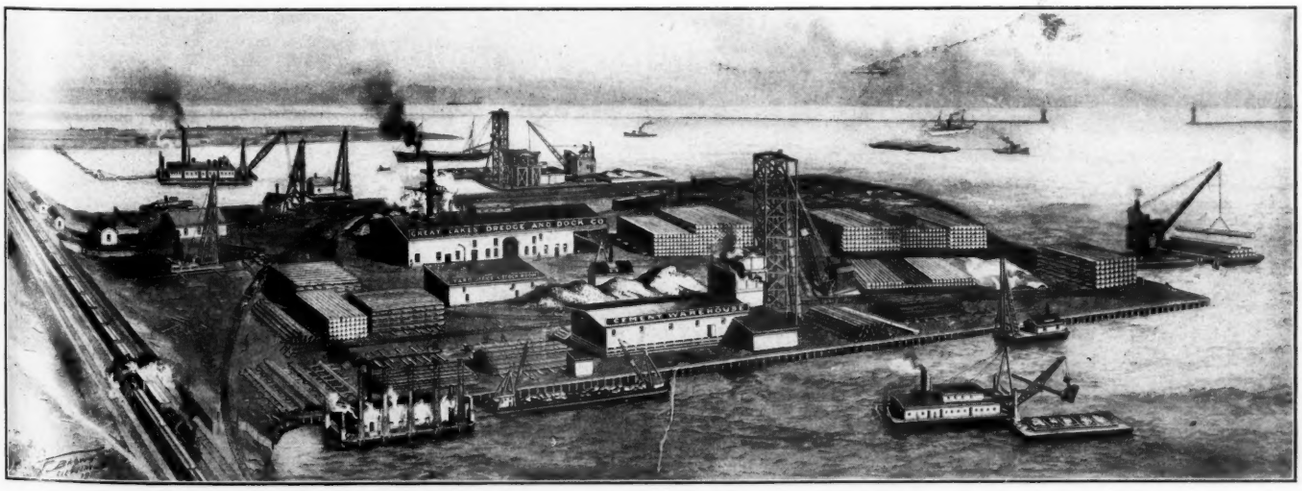
To protect the government channel during the progress of the filling, and also to facilitate the work, a temporary wooden pile trestle, filled with riprap, was built on the lines indicated in the plan of the property reproduced herewith. The trestle parallel with the shore was located a considerable distance back from the established harbor line, so as not to interfere with the construction of the dock and machinery foundations. The fill was carried outward from the shore and inward from this trestle, the material being brought out in cars and leveled by a track spreader. Experiments were made with a locomotive crane equipped with a grab bucket for handling this material, but it was found that it was more economical to use hand labor in the method described above. Approximately 1,000,000 yds. of filling material was deposited, the made land being 1,850 ft. long and 850 ft. wide.

DOCK FOUNDATION.

The dock proper is supported on a double row of 40-ft. reinforced concrete piles, spaced 3 ft. center to center, supporting a concrete superstructure heavily reinfored with 85-lb. rails. Reinforced concrete struts spaced 30 ft. center to center and supported on single rows of reinforced concrete piles 30 ft. long, connect the dock face with the foundation wall supporting the rear leg of the unloaders. This wall, which is parallel to, and approximately 75 ft. from, the face of the dock, is supported on three rows of reinforced concrete piles 30 ft. long, driven on 4-ft. centers. Small riprap stone was placed around these piles upon which the concrete was laid. Reinforced concrete sheet piles 10 in. x 12 in. in section were laid horizontally between the two rows of piles supporting the dock, and the space between the rear walls and the face of the dock was filled with riprap stone, varying from shovel to derrick size, a wooden trestle being built from which to handle the stone with a locomotive crane. The riprap was carried up to lake level, and the whole mass pumped



Yard and Dock Arrangement; Pennsylvania Ore Unloading Dock, Cleveland, Ohio.

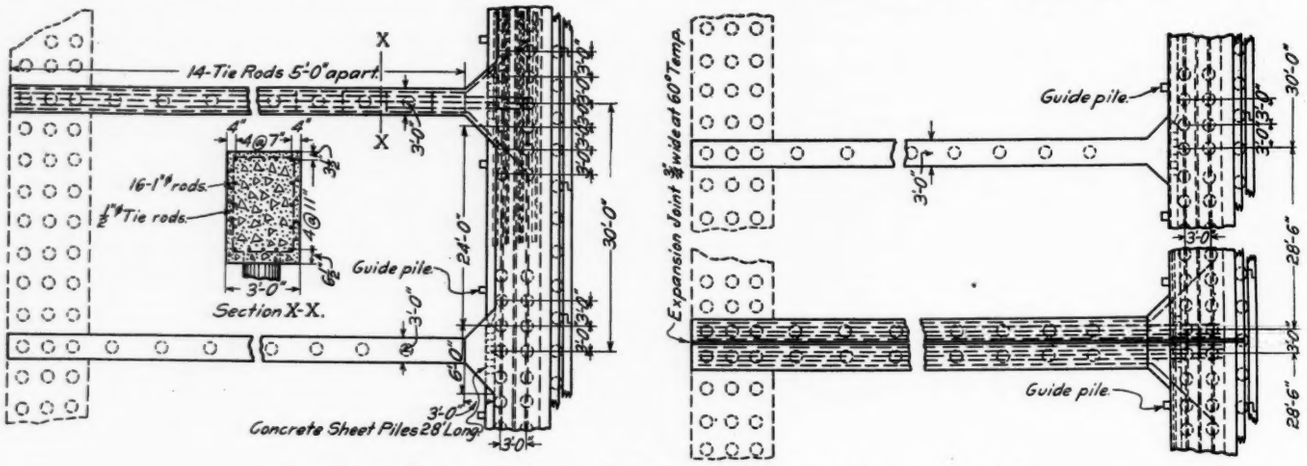


Contractor's Concrete Pile Plant, Shops and Yard.

full of lake sand by an hydraulic dredge. A mass of riprap filled with sand was also placed immediately back of the rear wall to form a support for the U-shaped concrete ore trough.

DOCK SUPERSTRUCTURE.

The dock is 985 ft. long over all, consisting of 32 spans between concrete struts. The reinforcement in the superstructure, with the exception of three spans at the west end, consists of nine 85-lb. rails, joined with angle bars fully bolted. The transverse struts, which are 3 ft. wide and 4 ft. 6 in. deep, are reinforced with 16 one-in. round rods looped over the reinforcing rails, as shown in one of the accompanying cross sections. These rods are held in place by ½-in. round tie rods at intervals of 5 ft. Each mooring post along the face of the dock is anchored by a vertical bolt 1¾ in. in diameter and 2 ft. 6 in. long, and an inclined bolt 2¼ in. in diameter and 6 ft. 6 in. long. A 12-in. by 12-in. oak waling strip protects the face of the dock from injury by ore boats. The superstructure in the three spans at the west end is reinforced by seven 1-in. round rods placed as shown in the accompanying cross section. The struts for those spans are T-shaped, being 3 ft. wide on top and 1 ft. 6 in. wide at the bottom. They are reinforced by nine 1-in. round rods near the bottom of the section which are bent up in the superstructure of the dock and the foundation wall to form a bond with those members.



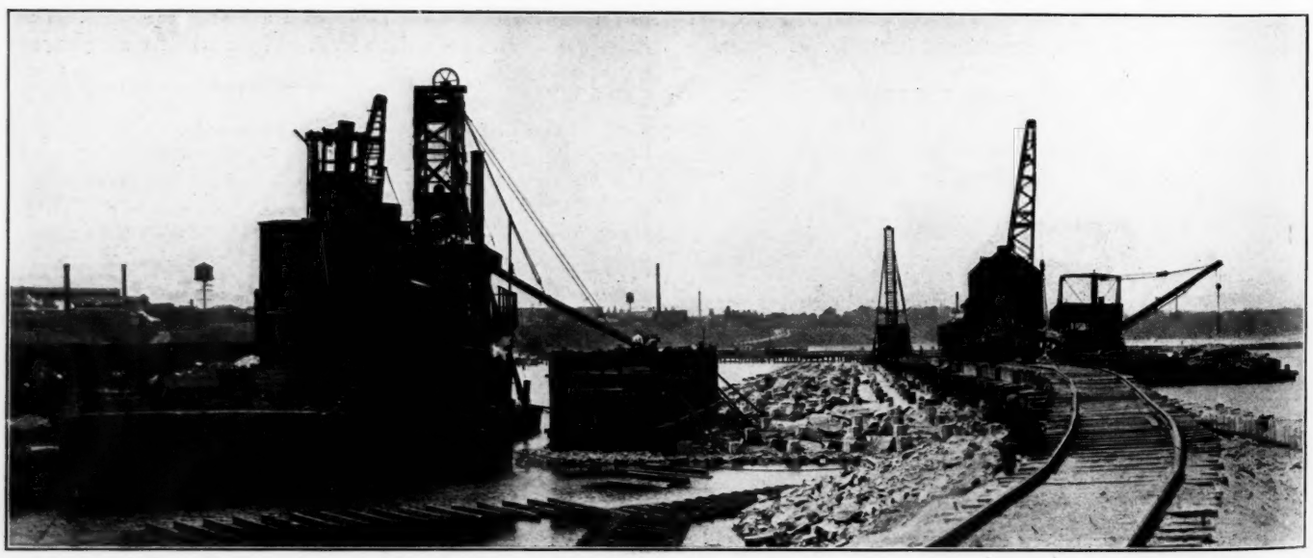
Typical Plans of Dock, Showing Concrete Tie Rods and Expansion Joint.

The ore trough which adjoins the foundation wall under the back leg of the unloaders is 44 ft. wide over all, the flat inner surface being 28 ft. wide. The walls of the trough are 16 ft. 6 in high. The bottom of this trough, which is 2 ft. thick, is reinforced by six rails, spaced 4 ft. center to center, laid with the head flush with the surface of the concrete. The foundations for the ore bridge are 266 ft. apart center to center, the nearest one being 168 ft. from the foundation wall supporting the unloader track and 144 ft. 6 in. from the face of the dock. The footing for these walls is 10 ft. wide, the wall proper being battered to a thickness of 5 ft. at a point 4 ft. above the surface of the ground. The total height to the bottom of ties is 16 ft. These walls are not reinforced. Expansion joints ¾-in. wide at a temperature of 60 deg. F. are provided in the dock at intervals of 150 ft.

About 3,500 cu. yds. of concrete were placed in the dock struts and unloader walls, 5,900 cu. yds. in the bridge walls and 9,000 cu. yds. in the ore trough. The concrete mixture in the superstructure was 1:3:6. The concrete in the dock wall was placed from a floating plant, as shown in one of the photographs, and the ore trough and bridge walls were placed from a mixer car on a construction track, material being supplied to the mixer by wheelbarrows from cars on the same track. The concrete was hoisted to the top of a tower and deposited in the wall through a chute.

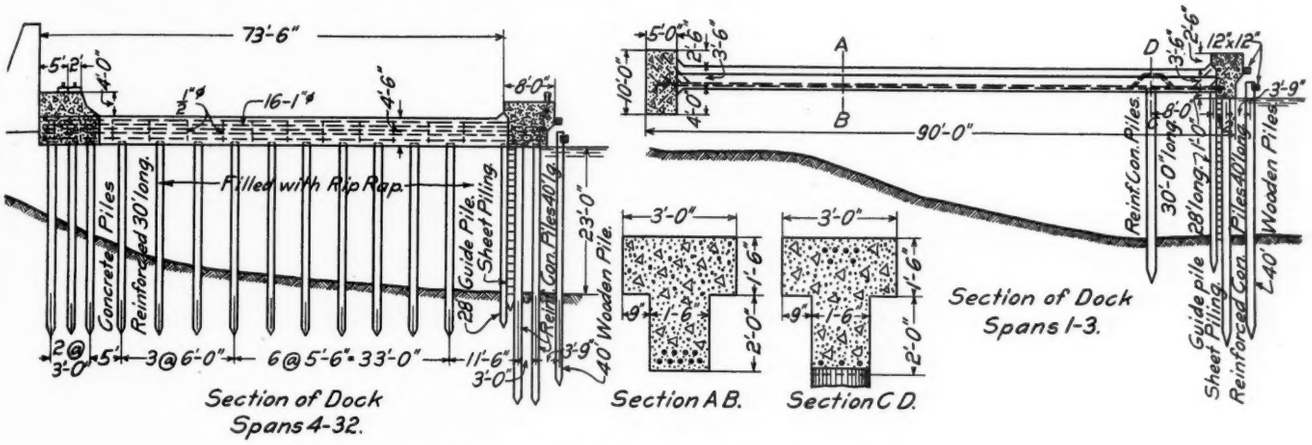
CONCRETE PILES.

The concrete piles used on this work are octagonal in shape, reinforced with eight 1-in. steel rods spaced longitudinally, and securely bound by ⅜-in. tie rods. These rods are spirally



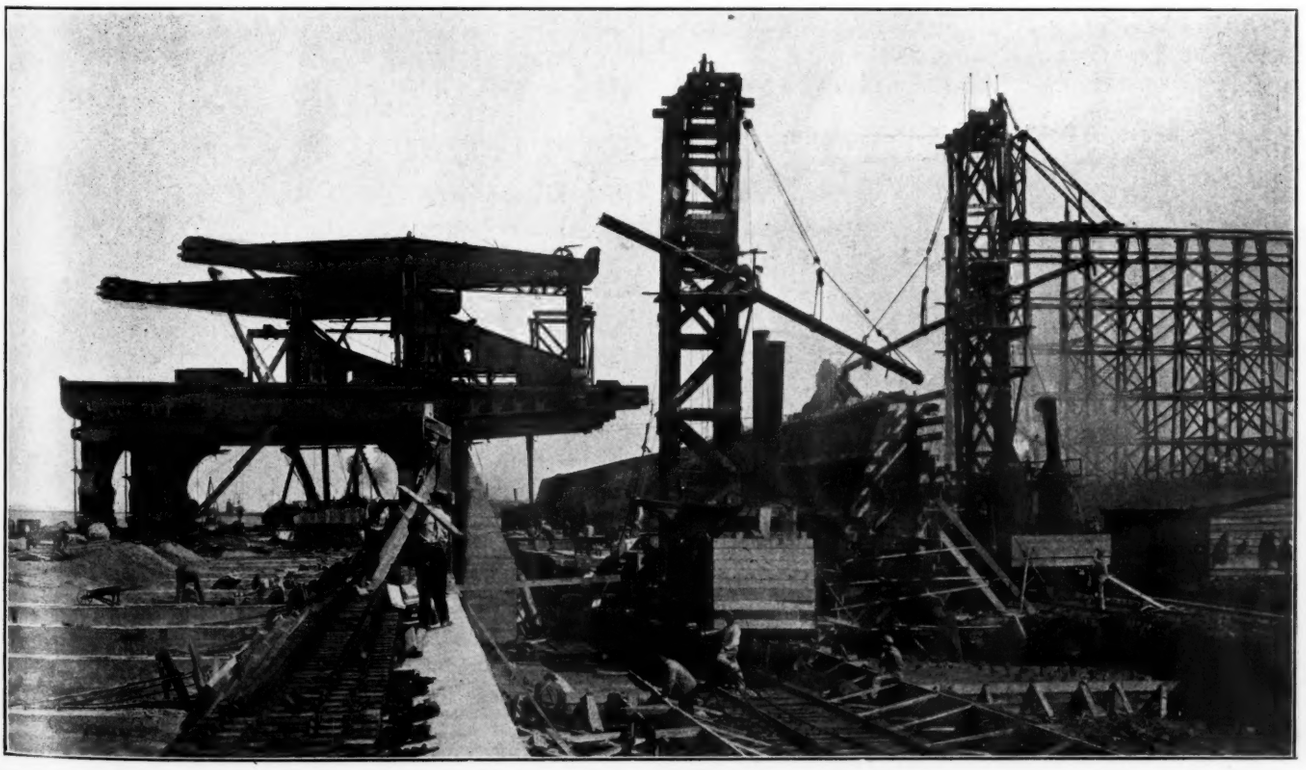
View of Floating Mixer Plant and Pile Driver; also Showing Locomotive Crane Placing Rip Rap in Dock Foundation.

wrapped for a distance of 4 ft. from the top and 3 ft. 6 in. from the point. Single tie rods are spaced 2 ft. apart through the body of the pile. A cast iron shoe was fitted into each form to cover the point, becoming an integral part of the finished pile. A 1:2:4 mixture, using ¾-in. screened limestone, was used in the body of the pile, one ¼-yd. batch of 1:1 cement mortar being placed in the point. The piles were made at the plant of the Great Lakes Dredge & Dock Company, which adjoined the site of the work. The material was received in cars and handled by hoisted to an elevation from which it could be dropped into the upper end of the piling form. A steel cap was then placed on the form and the pile and form were placed in a curing bed of live steam for about 18 hours. The forms were removed in from 12 to 24 hours after pouring. When the piles were removed from the hot beds they were piled in storage and allowed to season thirty days before driving. The manufacturing plant included a large cement warehouse, storage yard, curing beds, heating plant for concrete materials, mixing and casting



Typical Cross Sections of Ore Unloading Dock.

a locomotive crane. As most of the piles were made in January, February and March, it was necessary to heat all materials by steam pipes placed in tunnels formed by interlocking steel sheet piling under the piles of sand, gravel and broken stone. The water was kept heated in a similar way. The rings that were used in the reinforcement were made in the company's shop by a specially designed machine, and were taken to the assembling yard and laid in steel forms. These forms were picked up by a locomotive crane and placed on end alongside the casting tower. The concrete was mixed at the base of this tower and tower, and ample switching facilities. The ties were loaded from the storage pile at the edge of the water on to scows which were towed to the side of the dock, the piles being driven by floating pile drivers. Each one was numbered and a record kept of the date of its manufacture to guard against driving within 30 days after casting. As the driving was somewhat delayed, however, no trouble was experienced with green piles. Several forms of driving caps were experimented with, but it was found that the ordinary cast iron hood, about 3 ft. long, with a hard wood filler block covered by a few coils of rope, was the most



Ore Unloaders in Position and Ore Trough Under Construction.

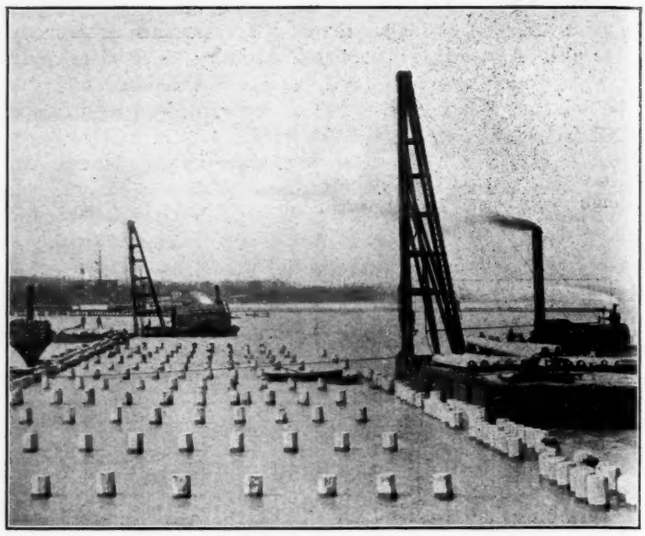
satisfactory. Most of the piles were driven without excessive hammering, but in some individual cases they showed remarkable ability to stand punishment. For instance, a 30-ft. pile required 111 blows of a 5,000-lb. hammer falling 3 ft. 6 in. to secure the last foot of penetration. Another 30-ft. pile required 840 blows of a 3,000-lb. hammer falling 3 ft. These piles suffered no appreciable damage except battering of the head, which was later buried in the concrete superstructure. The piles drove to a very good line, as shown in one of the accompanying photographs. The number of piles made was as follows: Octagonal, 625 40 ft. long, 2,647 30 ft. long, 120 24 ft. long, 120 20 ft. long; sheet piles, 932 24 ft. long, 210 28 ft. long.

DOCK MACHINERY AND POWER EQUIPMENT.

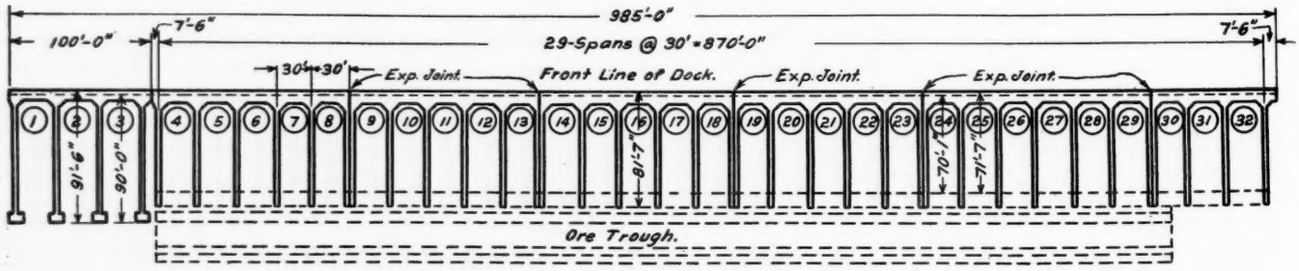
The unloading equipment consists of four 17-ton Hulett unloaders and one 15-ton ore bridge built and erected by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. The unloaders are electrically-operated, 220-volt d. c., current being supplied. They have sufficient reach to unload boats of 65-ft. beam, and are equipped with a 70-ton receiving hopper and 50-ton larry arranged to load ore into cars standing on any one of four loading tracks or into the ore trough, from which it can be placed in stock piles by the bridge. Each machine is equipped with scales for weighing the ore before loading into cars, the scales being a part of the larry car equipment. The capacities of the motors are as follows: 300 h. p. for beam hoist, 100 h. p. for trolley, 100 h. p. for bucket closing, 150 h. p. for ore gate and travel motor, 150 h. p. for larry car haulage, 35 h. p. for rotating bucket and 35 h. p. for larry gates. These machines are the largest ore unloaders ever built, and it is expected that they will handle an average of 600 tons per hour, to do which their capacity during the early stages of unloading must reach a rate of 1,000 to 1,200 tons per hour for each leg.

The bridge has a central span of 266 ft., with two cantilever arms 173 ft. long to the extreme position of the bucket. This provides a total length of 612 ft. In rehandling ore from the stock piles the bridge bucket discharges into a 75-ton receiving hopper built into the framework of the main tower. This hopper discharges into a scale hopper located over a loading track adjacent to the bridge foundation wall so that ore can be discharged directly from scale hopper to cars. The bridge is moved along its tracks by 75 h. p. motors connected by gearing and shafting to driving trucks under the tower and shear leg, these motors being controlled from the operator's house suspended from the main bridge tower. The bridge runs on 3-ft gage tracks laid with 100-lb. rails on oak ties 3 and 4 ft. long spaced 1 ft. 6 in. center to center, every third tie being drift bolted to the foundation, and all ties being connected by a 2-in. by 12-in. plank outside the track. Special tie plates, clips and screw spikes are used on all ties.

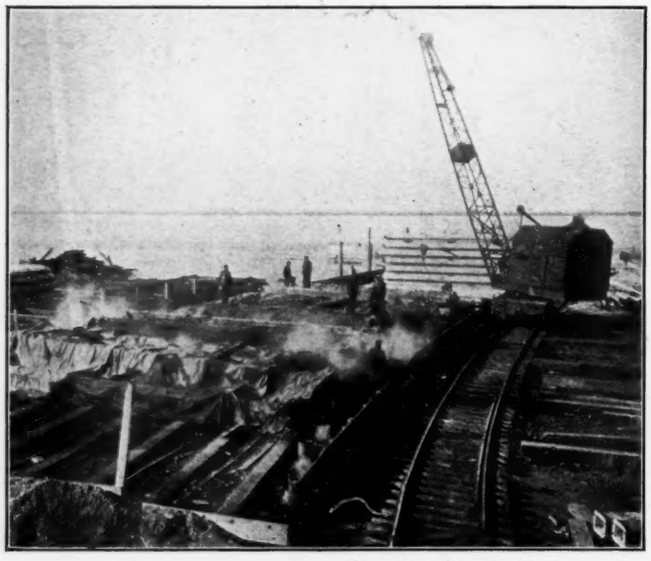
The power for operating the plant is secured from a power house 150 ft. by 60 ft., located at the west end of the property, the floors and columns being of reinforced concrete, the frame of steel, and the walls of brick. Coal for this plant is received in hopper cars over a wooden trestle approach to the bunkers, which are built entirely of concrete and located outside the building. A grab bucket operating on an elevated track carries the coal from the bunkers to the crusher located over steel hoppers, through which the coal passes to the stokers. The ashes are dropped from the grates through a chute into standard gage cars running on tracks on the first floor. The equipment of the power house includes three 600-h. p. Babcock & Wilcox Stirling boilers equipped with Roney stokers and individual steel stacks 66 in. in diameter and 125 ft. high; two Dravo & Doyle centrifugal boiler feed pumps, three Allis-Chalmers non-condensing turbine-driven jet condensers, one 2,500-h. p. Cochrane water heater, one 800-k.w. Westinghouse generator, three 750-k.w. Allis-Chalmers turbo-generators, three 500-k.w. Westinghouse



Driving Piles Under Dock and Transverse Ties.

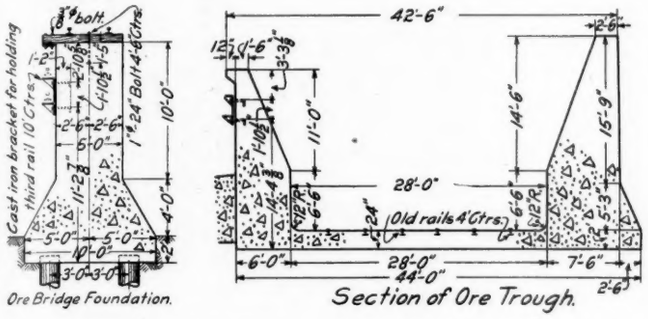


General Plan of Pennsylvania Ore Unloading Dock and Ore Trough.



Hot Storage Bed for Concrete Piles.

rotary converters, two 50-light General Electric arc lamp tubs, and two 500-gal. Watson-Stillman general service pumps. Water is taken directly from the lake through a 30-in. pipe to an intake well located under the turbines. The hot well is located above the intake well, and overflow is discharged into the lake through a 30-in. pipe. Power for the machinery on the dock is carried by cable through underground ducts to the forward bridge and trough walls, along which it is distributed through 85-lb. rail



Cross Sections of Ore Bridge Foundation and Ore Trough.

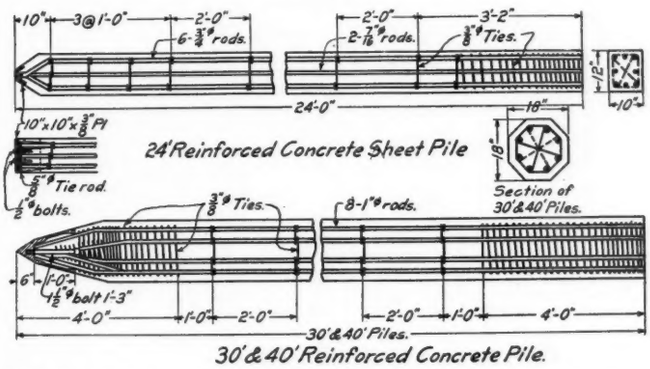
supported on cast iron brackets bolted to the walls. Electric locomotives are used for shifting cars beneath the unloaders, power being supplied by rails between the rails of the narrow gage running track. These locomotives are of 25 tons weight, 3 ft. 6 in. gage, and are provided with side pusher arms designed to handle the standard gage cars on adjacent tracks. The spacing of 18 ft. 6 in. between outside loading tracks provides room for a narrow gage track between each of these pairs of loading tracks, allowing the electric locomotives to reach cars standing on any track under the unloader.

A machine shop 60 ft. x 70 ft. at the west end of the property will handle repair work necessary on the ore handling machinery, and will be provided with a 25-ton crane, the runways of which will extend across the tracks in front of the building so that repair parts can be handled direct from cars to the shop. This crane will also be used for handling the electric locomotives, An office building 25 ft. x 40 ft. will be provided, fitted with office rooms, locker rooms and toilet facilities for the use of the operating forces.

YARD AND SUBWAYS.

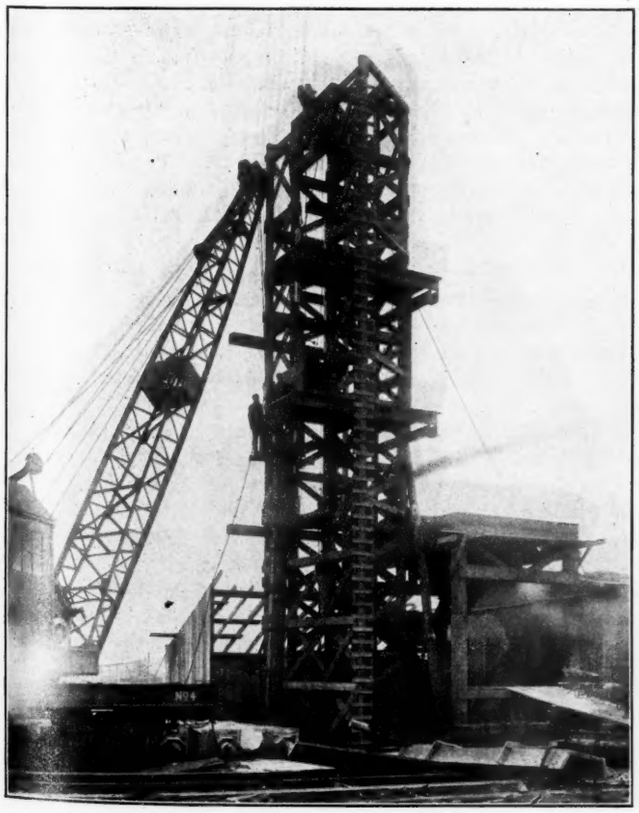
The track development is shown in the accompanying plan. Empty cars coming to the plant are stored in the yard at the east end, from which they can be switched directly to the four tracks under the unloader or to the single track along the bridge. Loaded cars are stored in the large yard south of the stock piles. This arrangement of tracks makes the movement of cars at the dock continuous.

In order to reach the property it was necessary to build a



Details of Reinforced Concrete Piles Used in Foundations of Dock and Walls.

double-track undergrade crossing with the Lake Shore & Michigan Southern at Hickory street. The structure has very heavy reinforced concrete walls supported on concrete piles. The floor under the Lake Shore tracks is of heavy I-beams encased in concrete with a supporting row of columns at the center of the span. The Lake Shore at this point has seven tracks, only two



Casting Tower, Mixing Plant and Locomotive Crane.

Cast Iron Hood Over Head of Piles.

of which could be abandoned at a time, making it necessary to build the structure in short sections, working from south to north, the overhead tracks being carried on pile trestles during the progress of the work.

This unloading dock was designed and its complete development carried out under the direction of R. Trimble, chief engineer maintenance of way, Northwest System. The Great Lakes Dredge & Dock Company had the contract for making and driving all concrete piles, and for building the foundations for the power house and the substructure for the Hickory street subway. The Drava Contracting Company built the concrete ore trough.

PRESIDENT MILTON H. SMITH ON INDUSTRIAL RAILWAYS AND UNFAIR DISCRIMINATION.

The following are verbatim extracts from the testimony on the subject of industrial railway and unfair discrimination recently given at St. Louis by Milton H. Smith, president of the Louisville & Nashville, before an examiner of the Interstate Commerce Commission in the hearing of the case of the Manufacturers' Railway Company of St. Louis vs. St. Louis, Iron Mountain & Southern Railway Company et al:

DIRECT EXAMINATION.

Mr. Stone (counsel, L. & N. R. R.): Can you explain why it is that so few breweries are located on tracks of steam railways? . .

Mr. Smith (president, L. & N. R. R.): . . . It is, I think, a fact that, with few exceptions, all of the existing brewery plants were originally located at points without track connection; and I think the reason therefor is that they were first created to supply the local demand for their product; that shipment to other points was not at the time given much if any consideration; and the further fact that the incoming freight, or the material from which the liquors are manufactured, forms a small part of the tonnage of the output. I believe it is a fact that the original Anheuser-Busch brewing plant was located without rail connections, and was operated without such rail connections until that company built tracks connecting its plant with the tracks of the St. Louis, Iron Mountain & Southern.

. . . . . .

Mr. Stone: Do you know, Mr. Smith, in what way the Anheuser-Busch Brewing Association got its product to the railway before the construction of the Manufacturers' Railway tracks?

Mr. Smith: I assume they must necessarily have moved it between the plants and the various shipping points or receiving points by street vehicles.

Mr. Stone: Do you know whether the present method of moving its product over the tracks of what is called the Manufacturers' Railway is more economical to the brewing association than it was before?

Mr. Smith: Well, I must assume that the management of that plant when it created these facilities believed that it would be more economical or it would not have made the investment.

. . . . . .

Mr. Stone: . . . State in your own way the view you have of the reasonableness of this allowance ($4.50 per car) and the effect it has upon the carriers in the shipments made for the Anheuser-Busch Brewing Association. If you can state any facts or give any illustration showing that effect and what the carriers by reason of it realize out of the shipments of the product of that brewing association, please state.

Mr. Smith: Any allowance to the Anheuser-Busch Company through the Manufacturers' Railway, whereby the rail lines transport property shipped to or shipped by the brewing company at a less rate than the current tariff rates is an unjust, illegal and criminal reduction in the rates, prohibited by the Act to Regulate Commerce. . . . To illustrate, during the month of October, 1911, . . . (ten) cars of beer were shipped by the Anheuser-Busch Company via the Louisville & Nashville to Memphis, Tenn; . . . average weight per car 24,475 lbs.; through rate 16 cents per 100 lbs.; total revenue $391.60, of which $4.50 per car or $45 was rebated to the Anheuser-Busch Brewing Company through the Manufacturers' Railway Company for alleged services in delivering the loaded cars to the tracks of the Wiggins Ferry Company. It will be seen, therefore, that the rebate amounted to about 11.5 per cent. of the total revenue for which the brewing company moved the cars over its main line, a distance of something less than 4,000 ft., while the Louisville & Nashville assumed the cost of moving the traffic between the point of interchange with the Wiggins Ferry and Memphis, 477 miles, including the crossing of the Mississippi river at St. Louis, the Ohio river at Evansville, the Cumberland at Clarksville, Tenn., the Tennessee river at Danville, Tenn., and also furnished the terminal facilities at Memphis. The property was moved in refrigerator cars, for which the Louisville & Nashville paid the owners ¾ of a cent per mile going and returning, or $7.16. . . .

Under an arrangement between the Manufacturers' Railway and numerous connecting railways whereby the Manufacturers' is practically made a party, so far as these roads can do so, to the per diem rules agreement, had the shipments been moved in refrigerator cars not belonging to private lines, or, say, in refrigerator cars of the Louisville & Nashville or Illinois Central, some benefit would have been derived by the owners of the Manufacturers' Railway, growing out of the fact that it is allowed what is designated as six days' reclaim. That is, at this season of the year the per diem charge on such cars would have been 35 cents per day; and should an L. & N. refrigerator car have been delivered to the Manufacturers' Railway and loaded and returned the same day, it would have received as six days' reclaim $2.10. The Louisville & Nashville is not at present a party to this arrangement.

Another concession made to the Anheuser-Busch Brewing Association through the Manufacturers' Railway is the issue of passes to the officers of that company, including August A. Busch, chairman of the board; G. F. Moore, president and general manager; Adolphus Busch, vice-president; R. Muehlberg, traffic manager, and their families, and including in some instances transportation for private car, for what is known as pass for car and party. Such issue of passes does not seem to be authorized by the act to regulate commerce. It is supposedly done under the provision of section one of the act, reading as follows: "Provided, that this provision shall not be construed to prohibit the interchange of passes for the officers, agents and employees of common carriers and their families." There cannot be an interchange of passes between the various steam carriers, extending from the Atlantic to the Pacific, and the Manufacturers' Railway.

. . . . . .

Mr. Stone: Should any allowance be made by the steam railway carriers to cover the cost or the charge that may be made by the Manufacturers' Railway for moving empty and loaded cars between the plants or warehouses of industries, other than those of the brewing company, located on the Manufacturers' Railway? . . .

Mr. Smith: In my opinion no allowance is reasonable or can be legally made. If the carriers transport property shipped by or received by the so-called independent industries located on or near the tracks of the Manufacturers' Railway, from point of interchange, for less than the current tariff rates, it would be an unjust discrimination against similar industries located at points where their property must be moved by street vehicles between the plants and point of delivery or receipt by the steam railways. I am informed that practically all of the industries now located on the Manufacturers' Railway were in existence before the railway was built, and necessarily had to bear the cost of moving property between their plants and the railways. They are entitled to any advantage that may accrue to them resulting from the difference in the charge of the Manufacturers' Railway for moving property between their plants and point of

interchange with the railways—say the St. Louis, Iron Mountain & Southern and Wiggins Ferry—and what it had heretofore cost them to handle their traffic by street vehicles. Any concession that is made from the established tariff rates, from point of interchange, is an unjust discrimination against similar industries located without track connection

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Mr. Stone: Upon what basis is the charge by the various railways for switching for each other in St. Louis and East St. Louis fixed, if you are familiar with that subject?

Mr. Smith: Upon a reciprocal basis. The railways switch for each other, and if it is approximately reciprocal—that is, if what one does for the other is approximately reciprocated by return switching, it makes very little difference what the charge is, whether it is $1 per car or $5 per car. . . .

Where reciprocity is not equal the railways do refuse to switch for each other. As an illustration: The Louisville & Nashville does not switch competitive traffic for competing lines on shipments to and from Louisville, because up to this time the industries located on its lines in the city of Louisville are largely in excess of those located on competing lines for which it may desire to compete; and the Southern Railway refuses to switch competitive traffic for the Louisville & Nashville at Knoxville, Tenn., and other points. . . .

As the Manufacturers' Railway cannot reciprocate—cannot furnish transportation facilities for which the various steam railways may compete—the charge for interchange or reciprocal switching between the various railways competing for traffic to and from the city of St. Louis and East St. Louis has no bearing whatever upon the charge to be made by the Manufacturers' Railway for non-reciprocal switching, for which, as heretofore stated, no allowance should be made. The cost of moving traffic between the various industries reached by the tracks of the Manufacturers' Railway and point of interchange with the steam railways, should be borne by the owners of the property, and should not be made the basis of making unjustly discriminating rates by the steam carriers.

The Terminal Railroad Association and its affiliated lines about St. Louis are owned by the various steam railways having terminals in St. Louis and East St. Louis. Each of the proprietary lines, therefore, treats these Terminal Association lines as part of its system, and the Association renders services for each of the proprietary lines upon the same terms and conditions. The division of the revenues accruing to the Association and its proprietary lines upon traffic moved is a matter of interest only to the parties directly interested, and is no criterion for a basis of a division of revenue between switching lines, or plant facility tracks like the Manufacturers' Railway, and the steam roads.

. . . . . .

Mr. Stone: A good deal has been said in this record in regard to the allowance of $4.50 to the Manufacturers' Railway by the connecting lines, placing that allowance in their tariff filed during the last year. Will you please state the grounds or causes which led to the putting of this allowance in the tariffs of the several defendant railways in this case?

Mr. Smith: The cause is incompetent management of railways—the same cause that for years disgraced the managements of the railways of the country in the conduct of their traffic, resulting in unjust discriminations between large and small shippers. Unregulated and ruinous competition, resulting in the bankruptcy of many of the railways of the country; in dissatisfaction of the people of the country, which eventuated in legislation whereby the United States government, through the Interstate Commerce Commission and the courts, has assumed responsibility, prohibiting unjust discrimination and requiring the maintenance of established rates. The disgraceful concessions that have been made by the various railways to the Manufacturers' Railway, since the decision of the Interstate Commerce Commission that it was a common carrier, are conclusive evidence that were it not for the restraining power of the United States government, chaotic conditions would again be created by the inability of the railway managements to adopt and maintain reasonable and just tariffs, intended to put all shippers and patrons of the railways upon the same basis.

The concessions made to the Manufacturers' Railway are disgraceful. It shows that by the skillful playing of one road against the other, the big shipper has succeeded in enmeshing all.

It has been accomplished, mainly through the weakness of the railway managements, by the use of the boycott. An officer of the St. Louis Southwestern recently admitted to me that that company was the first to make the concession, or, as he expressed it, that company was "the goat." When asked what compensation or reward that company received, he said they were receiving about 20 carloads per day of shipments from the Anheuser-Busch Brewing Company.

. . . . . .

CROSS EXAMINATION.

Mr. Schnurmacher (counsel for Manufacturers' Railway): I observe that your answers have been read from a typewritten statement in your hands. Who prepared that?

Mr. Smith: I did.

Mr. Schnurmacher: Were you assisted by anyone in the preparation of the paper?

Mr. Smith: I was not: . . I have necessarily to assume the entire responsibility of it, and do so. . . .

Mr. Schnurmacher: Who prepared the interrogatories; counsel?

Mr. Smith: I did. . . .

Mr. Schnurmacher: You prepared the questions to be propounded to you?

Mr. Smith: And the answers.

. . . . . .

Mr. Smith: Interrogatory No. 12 (omitted in direct examination) reads as follows: "Does the fact that the Interstate Commerce Commission decided that the Manufacturers' Railway was a common carrier justify the concessions that have been made by the steam carriers to the Manufacturers Railway . . . ?" . . .

(The answer is): The Interstate Commerce Commission decided that the Manufacturers' Railway was a common carrier, subject to the act to regulate commerce. All corporations or persons that transport property for hire are common carriers. The Interstate Commerce Commission has, however, distinguished the Manufacturers' Railway from other similar common carriers, as being subject to the act to regulate commerce. This decision did not justify the railways in making the concessions that have been made. It does not follow that the commission will, after due consideration, decide that the Manufacturers' Railway is entitled to any concession or to participate in the through rate. . . .

Mr. Schnurmacher: What working arrangement, what traffic arrangement is there at this time between the Louisville & Nashville and the Manufacturers' Railway in force?

Mr. Smith: I am not accurately informed, but I believe that with the exception of one or two matters like the per diem rules agreement which Mr. Moore testified to yesterday the Louisville & Nashville is in the same category as the other railways, and is therefore subject to the same criticisms I made on incompetent management of the railways.

Mr. Schnurmacher: It is equally criminal then, in your opinion, with all the other railways?

Mr. Smith: Certainly.

. . . . . .

Mr. Schnurmacher: . . . When did you learn that some tariff had been filed whereby the charges of the Manufacturers' Railway were being absorbed by your company?

Mr. Smith: I don't recall that I ever saw the tariff or that I was ever consulted. I was brought into the contention . . . in connection with another somewhat similar contention that the so-called Birmingham Southern had made, which if (this) contention was granted, very seriously affected or would very seriously affect the interests of the Louisville & Nashville; and that it based its tariff largely upon the decision of the Interstate Commerce Commission in the Manufacturers' Railway case. If its

contention was granted it meant a similar allowance to numerous other industries similarly situated performing somewhat similar although a less expensive service on various parts of the Louisville & Nashville system. The revenues involved or the cost involved was so great that my efforts necessarily were called into action to prevent this imminent disaster to the Louisville & Nashville. . . .

Mr. Schnurmacher: With respect to these other cases which you have referred to, you are making the contention that they are mere tap lines or industrial railways and not common carriers, are you not, Mr. Smith? . . .

Mr. Smith: There are numerous other industries besides the Anheuser-Busch Brewing Association in and around St. Louis as well as other parts of the country that have constructed and maintain tracks and operate them and are entitled to the same concessions that may be allowed the Manufacturers' Railway. . . .

If the conditions that now exist are to continue you will breed industrial railways or railways of a similar character as you might breed rabbits. There are probably a dozen in and around St. Louis with their mouths open and their teeth sharpened to receive similar concessions. Some are already being built. . . .

Now, I do not believe the United States government has created a commission and enacted laws to give undue advantage and require unjust discrimination in favor of such subterfuges, because it is nothing but a subterfuge. The Anheuser-Busch Company, in addition to the profits of its regular business, is endeavoring to secure additional profits and additional advantages over its competitors through this Manufacturers' Railway, which is owned by the same interests that own the brewing company.

. . . . . .

Mr. Schnurmacher: What steps have you taken to cancel those absorptions and prevent the payment of criminal and illegal rebates in your opinion, under the tariffs in force between you and the Manufacturers' Railway Company?

Mr. Smith: I have not taken any and . . . I am therefore running the risk of being sent to the penitentiary, I suppose.

Mr. Schnurmacher: Why are you taking that risk if in your opinion the absorption of those charges is illegal and criminal? . . .

Mr. Smith: Because, as I have already explained, there is a division of duties, and the traffic officials assumed the responsibility, and they did it because of the Big Stick, the boycott, and in my opinion they acted unwisely and also illegally. . . .

Mr. Schnurmacher: Is there not another reason; is not the revenue the principal reason why you have not ordered the cancellation of that arrangement?

Mr. Smith: The matter of revenue derived from transportation of malt liquors did not, I confess, receive my personal attention until recently, or until I commenced looking into this matter; in view of this possible hearing I directed the auditor of receipts of the Louisville & Nashville to prepare a statement of the shipment of malt liquors from St. Louis and East St. Louis and some other points during the month of October. And I also undertook to advise myself of the tariff rates we were receiving for the transportation of such property, and I was greatly surprised to find that we were transporting a large part of the traffic under rates and conditions, conditions being exceedingly onerous, that in my opinion rendered the business unremunerative. So that I have not as yet had an opportunity to make up my mind what was best to be done in the future. But much, of course, will depend upon the final adjudication of this contention by the Interstate Commerce Commission and possibly by the courts of the United States, and if the decision is finally against the railways and what I deem against the interests of the railways, then I shall be prepared to take up with the officials of the Louisville & Nashville the question of quietly withdrawing from competition for traffic that I believe to be unremunerative.

. . . . . .

Examiner Mackley: The Commission did not condemn the allowance or divisions outright in its report, did it?

Mr. Smith: As I understand, the commission merely decided that under the act to regulate commerce the Manufacturers' Railway was a common carrier and that, therefore, an allowance might be legally made; or, to put it another way, that through rates might be established between points on the Manufacturers' Railway and points on the steam road; but they did reserve the question of what the allowance should be, cautioning as I think, the steam railways against allowing too much or possibly against allowing anything, or so far as it related to property shipped by or received by the independent industries, and reserving, however, the right to decide what portion or part of the Manufacturers' Railway was a plant facility.

. . . . . .

Examiner Mackley: You constructed that opinion to mean that that referred only to independent shippers; is that your idea?

Mr. Smith: Well, not necessarily, although the Commission in that opinion did reserve the question as to what part of the Manufacturers' Railway was a plant facility, the inference being that should they decide that the tracks serving the Anheuser-Busch Brewing Association were a plant facility no allowance could be legally made to the Anheuser-Busch Company.

Examiner Mackley: They did not find in there or make any statement that these allowances as a whole were unlawful in their opinion; that is, whether the Anheuser-Busch Brewing Association or to independents?

Mr. Smith: They seem to have left the question of allowance to the judgment of the parties directly interested, the steam railways and the Manufacturers' Railway, at the same time cautioning them that they must not make an undue allowance that could be construed as being excessive and possibly an unjust discrimination. In other words, the question was left open.

Examiner Mackley: What I mean is, did you construe that to mean that they were not to make any allowances at all to the Anheuser-Busch people, and that the allowances to them were unlawful, but they might not be lawful to the independent shippers?

Mr. Smith: Does not that depend on whether they decide that the tracks of the Manufacturers' Railway in the Anheuser-Busch Brewing Association's plant are plant facilities, and that therefore the services rendered by the Manufacturers' Railway to the Anheuser-Busch Association is a plant facility service?

. . . . . .

Mr. Schnurmacher: Did you have . . . the opinion (of the Commission) in mind when you prepared your statement that you read here today? . . .

Mr. Smith: The United States government through Congress did not enact the Act to Regulate Commerce and create a commission charged with the responsibility of securing to the people of the United States equal and just treatment on the part of the carriers and then in addition or contrary to that purpose, or you might say cancelling that purpose, turn around and require the steam railways to discriminate in favor of this larger shipper as shown in that statement there—what was it, 30 per cent. of the total?

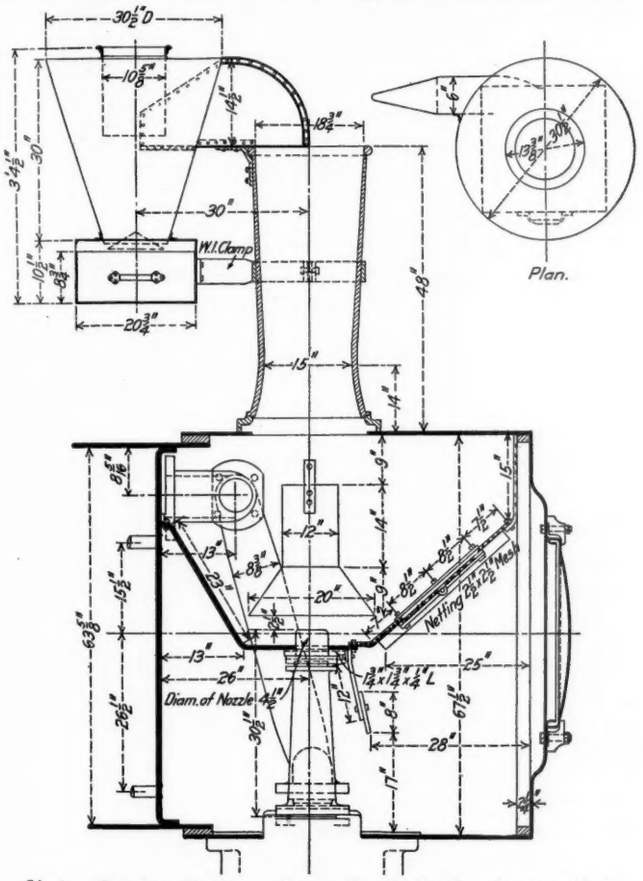
Mr. Schnurmacher: No, one-thirtieth of all the tonnage handled in St. Louis, they say, is this brewery product.

Mr. Smith: They cannot decide that the steam railways must make to that big shipper already controlling such a large part of the traffic of the city of St. Louis, undue concessions or make discriminations and transport the property of that concern for less than it does for similar industries, although they may be much smaller.

No figures as to tonnage over the Madeira-Mamore Railway, Chile, have as yet been received, but a statement has been made showing that the gross earnings from provisional operation up to mile 140, from January 1, 1911, to November 30, 1911, were $600,785. This is from provisional operation only, as the line is not yet open for commercial operation for fear of interfering with construction. Commercial operation will be inaugurated early this year as far as the mouth of the Abuna river.

TESTS IN SMOKE ABATEMENT ON SANTA FE SWITCHING LOCOMOTIVES.

The committee on Investigation on Smoke Abatement and Electrification of Railway Terminals, Chicago, which is working under the Chicago Association of Commerce, has issued six bulletins on various phases of the subject. Bulletin 6 is a report of tests made by the Santa Fe in smoke abatement and an analysis of smoke gases from switch engines in the Chicago yards. The report shows encouraging results from the use of Pocahontas coal, the brick arch and steam jets with 2-in. ferrules in the side of the firebox. It includes also one of the most thorough analyses of locomotive smoke gas that has ever been made. The pamphlet covers 32 pages and contains four large charts which give a continuous graphic record of the principal data. Six pages of the bulletin contain a detailed report on the analysis of locomotive smoke gases, which is not here included. The tests were made under the direction of H. B. McFarland, engineer of tests of Santa Fe.



Cinder Catcher Used on Santa Fe Switching Locomotive.

During the past eight or nine years a great many smoke preventers have been applied to locomotives in Chicago, and some of the appliances thus tried have been on the engines for several years. Few have had any value in reducing the total amount of smoke delivered from the stack. For the most part they were simply aids for the dilution of the smoke made in the firebox.

The most important apparatus applied to the locomotive for the reduction of smoke is the brick arch. It is of value in this direction, because it aids in maintaining uniformity of temperature of the gases in the firebox, even though there is great irregularity in conditions of operation of the locomotive. When the products of combustion contain free carbon, to any extent, as well as a quantity of tarry or hydro-carbon vapors, the resultant mixture is usually recognized as smoke. The degree or grade of smoke depends on the quantity of tarry vapors present in the mixture.

If, in the burning of coal containing a large percentage of volatile matter, the temperature of the resultant gases can be maintained sufficiently high and uniform for a considerable period of time, then the tarry vapors in the smoke will be greatly reduced. Unfortunately, however, the construction of our locomotives is such that the process of ignition and combustion of gases is accompanied with the extraction of heat from the gases in the same chamber or firebox, so that a uniformity in the temperature of the gases is not maintained.

Arrangements were made about two years ago to supplement these smoke-reducing devices by changing the grade of coal and the results of tests made at that time were so favorable that a change was made from Illinois to Pocahontas coal for switch engines in Chicago, even though the cost for the Pocahontas coal was 75 per cent. greater than for the Illinois coal.

OBJECT OF TESTS.

The object of the tests was to obtain an exact record of the smoke issuing from a locomotive in regular switching service in and around the Eighteenth street yards, Chicago, and to determine, if possible, the total amount and the size of the cinders thrown out by the switch locomotives. It was also desired to establish a comparison of the results now being obtained, with the percentage of smoke and cinders that would issue from a locomotive in regular and ordinary service if Illinois coal were used as formerly, instead of Pocahontas. Santa Fe switch engine 2024, in regular switching service in the passenger coach yards at Eighteenth street, Chicago, was equipped for comparative tests. It has a brick arch, 20 in. x 26 in. cylinders, six drivers 51 in. in diameter, and weighs 144,600 lbs. on drivers. The firebox is 41¼ x 102⅛ in., and the grate area is 29.2 sq. ft. Test runs were made with this engine using both Pocahontas coal and Illinois coal. The tank was calibrated and fitted with water gages so that the water consumption could be determined. A record was kept of the number of scoops of coal fired and an average weight per scoop was determined, so that the coal consumption could be calculated. Connections were tapped into the smokebox, so that samples of the flue gas could be drawn off for analysis.

It was found desirable to determine the character and the amount of the cinders thrown out of the stack. A specially designed cinder catcher was used for this purpose, a drawing of which is shown herewith. A portion of the stack area, in the form of a sector of a circle, laid off to be a definite percentage of the total stack area, is covered with a special hood. This hood conducts all of the smoke and cinders entering this known area into a sheet iron hopper, where the solid matter is separated and collected at the bottom, and the smoke is liberated to the atmosphere. The hood was shifted about the stack during the tests in order to collect an average sample of exhaust products.

All observations were made on a time basis. A continuous log showing the density of the smoke, the coal fired, the use of the injector, the use of the blower, and the steam jet operation, was recorded, as well as the number of cars handled at any given time, starts, stops, periods of standing, and any other data bearing on the general performance of the engine. These data have been plotted in chart form for a portion of a one-day test and are shown herewith. The charts give opportunity for a thorough study of the bearing the various operations in locomotive performance have toward one another in the production or abatement of smoke.

Smoke observations were based on a comparison with the Ringelmann smoke chart. No attempt was made to determine intermediate densities between 20, 40, 60 and 80 per cent., as the transition from one grade to another was accomplished too quickly to record. Samples of flue gases were drawn every hour during an interval of approximately 10 minutes, regardless of conditions of operation, so that the results give an average for the entire day's run.

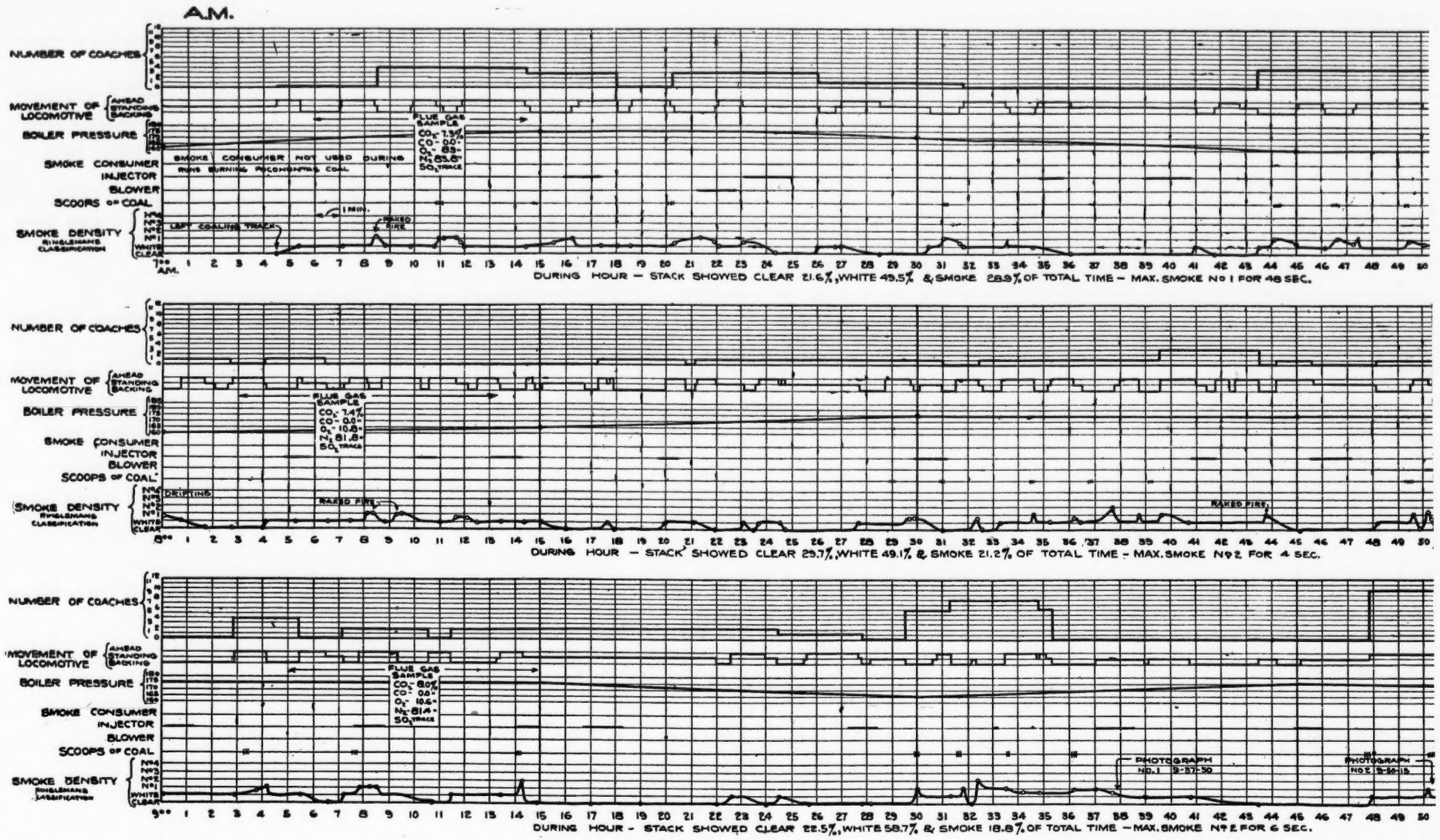


Chart 1—Typical Half Day's Performance of Santa Fe Switching Locomotive 2024 in Regular Service in the 18th Street Yards, Chicago, and Burning Pocohontas Coal.

RESULTS OF TESTS.

Smoke.—In making a general study of the smoke density for the period shown in the typical day's test, three classifications are made, viz., "smoke," "white," and "clear." The term "smoke" includes all grades from vapor to the maximum. By "white" is meant the absence of any color to the exhaust at time of observations. When "clear' neither smoke nor exhaust could be seen, nothing but a colorless heat vapor being driven off.

Pocahontas Coal.—The stack gases for the day's test with Pocahontas coal, based on the above classification, shows as follows: The division is based on the percentage of total elapsed time. Stack gases: White, 34 per cent.; clear, 42 per cent.; smoke, 24 per cent. During the test with this coal no smoke above the grade of No. 4 was observed. The average duration of smoke was from three to eight seconds, the smoke lasting only from four to eight exhausts after a given firing period; the stack then cleared up and showed white. The extreme periods of smoking occurred at the times the fire was raked or just after the engineer had shut off the steam and the locomotive was allowed to drift.

Illinois Coal.—A classification of the stack gases when burning Illinois coal, on the same basis as that used for the Pocahontas coal and divided according to the total elapsed time, is as follows: White, 18 per cent.; clear, 2 per cent.; smoke, 80 per cent. During this day's test, the maximum grade of smoke observed was No. 4, no dense black smoke being observed at any time. Not only was the duration of the smoking periods greater than with the Pocahontas coal, but the average density of the smoke was much higher.

Coal Consumption.—During a period of nine hours and forty-seven minutes, 251 scoops of Pocahontas coal were fired. This equals 3,765 lbs., or 386 lbs. per hour. The rate of evaporation was 9 lbs. of water per pound of coal fired. During a period of nine hours and twenty-seven minutes, 283 scoops of Illinois coal were fired. This equals 4,320 lbs., or 457 lbs. per hour. The rate of evaporation with the coal was 7.6 lbs. water per pound of coal fired.

A composite sample of each of the different coals was obtained in accordance with standards outlined by the American Society of Mechanical Engineers. The heating value of the coals was determined by the use of Mahler bomb calorimeter. The volatile matter, fixed carbon, ash, etc., were determined in accordance with standard methods of the American Chemical Society. The proximate analysis follows:

	Pocahontas.	Illinois.
Moisture, per cent.	1.76	0.45
Volatile matter, per cent.	17.21	30.87
Fixed carbon, per cent.	74.08	60.99
Ash, per cent.	6.91	7.69
Sulphur, per cent.	1.06	2.34
Heating value, B. t. u. per pound.	14,085	13,331

Analysis of Ash.—A composite sample of ash taken from the ash pan during each day's test analyzed with results as follows:

	Pocahontas.	Illinois.
Moisture, per cent.	0.59	0.61
Volatile matter, per cent.	7.85	3.97
Fixed carbon, per cent.	43.90	48.17
Ash, per cent.	47.65	48.25
Sulphur, per cent.	0.17	0.15
Heating value, B. t. u. per pound.	8,241	5,266

Cinders from Stack.—The special cinder hopper was used throughout each day's test. This device served to divert 10.87 per cent. of the total amount of exhaust gases passing out of the stack. The solid matter was separated and retained; the smoke was liberated. The position of the hopper inlet in relation to the stack was changed from time to time to obtain results that would reflect an average condition. Knowing the relation of the area of the hopper inlet to the area of the stack, the entire amount of cinders passing out of the stack could be estimated from the amount caught and retained by the hopper. The results for the Pocahontas coal were as follows:

Total elapsed time	9 hrs. 47 min.
Dry weight of cinders caught	2.75 lbs.
Estimated total weight of cinders thrown from stack	29.88 lbs.
Estimated total weight of cinders thrown from stack per hour	3.17 lbs.

The ratio of pounds of coal fired to pounds of cinders thrown from the stack is 1 to 0.0082. This ratio gives 16.4 lbs. of cinders passing from the stack per ton of coal fired, or only .82 of 1 per cent. of the coal fired goes from the stack in the form of cinders. In 1910, 22,608 tons of Pocahontas coal were fired in Santa Fe switch locomotives in Chicago. At the ratio of 16.4 lbs. of cinders per ton of coal fired, 185 tons of cinders were thrown from these locomotives in that year.

The following data covers the cinders thrown from the stack when using Illinois coal:

Total elapsed time	9 hrs. 27 min.
Dry weight of cinders caught	3.06 lbs.
Estimated total weight of cinders thrown from stack for entire day	32.65 lbs.
Estimated total weight of cinders thrown from stack per hour	3.46 lbs.

The ratio of pounds of coal fired to pounds of cinders from the stack is 1. to 0.0076. This ratio gives 15.2 lbs. of cinders passing out of the stack per ton of coal fired, or only 0.76 of 1 per cent. of the coal fired goes out of the stack in the form of cinders. In 1909, 24,714 tons of Illinois coal were fired in Santa Fe switch locomotives in Chicago. At the ratio of 15.2 lbs. of cinders per ton of coal fired, 188 tons of cinders were thrown from locomotives in Chicago during that year.

A proximate analysis of the cinders gave the following results:

	Pocahontas.	Illinois.
Moisture, per cent.	1.38	1.34
Volatile matter, per cent.	11.73	6.95
Fixed carbon, per cent.	27.40	39.41
Ash, per cent.	59.49	52.30
Sulphur, per cent.	0.59	0.26
Heating value, B. t. u. per pound.	4,362	6,103

These figures as to the cinders thrown from the stack in switching service discredit the popular theory of great heat losses due to cinders passing out of the stack. In Goss's "Locomotive Performance," figures are given for laboratory tests under various working conditions showing losses in the form of cinders passing out of the stack varying from 2.8 per cent. to 10 per cent. of the total coal fired. The results of the tests on engine 2024 in the Chicago yards, show but 0.82 of 1 per cent. of the total Pocahontas coal fired passing out of the stack in the form of cinders. These cinders contained but 4,362 heat units to the pound, whereas the coal initially contained 14,085 heat units to the pound, so that the loss in cinders passing out of the stack, expressed in heat units, is but 0.25 of 1 per cent. of the total coal fired. When firing Illinois coal the total cinders amounted to 0.76 of 1 per cent. of the total coal fired. These cinders contained 6,103 heat units to the pound, whereas the coal initially contained 13,331 heat units to the pound, so that the loss in cinders passing out of the stack, expressed in heat units, was but 0.35 of 1 per cent. of the total coal fired.

Flue Gas Analysis.—Samples of flue gas were drawn every hour over a period of approximately ten minutes. No consideration was given to the conditions of operation at the time samples were taken, so that the results obtained reflect average conditions for the day. Following are the average results of hourly analyses made during each day's test:

	Pocahontas.	Illinois.
Carbon dioxide, per cent.	8.0	6.8
Carbon monoxide, per cent.	0.0	0.0
Oxygen, per cent.	9.6	11.9
Nitrogen, per cent.	82.4	81.3
Sulphur dioxide, per cent.	Trace	Trace

There was a considerable variation in the per cent. of carbon dioxide as well as the per cent. of excess of oxygen for different samples taken at different times. At no time, however, did analyses show any per cent. of the poisonous carbon monoxide gases indicating incomplete combustion. Moreover, none of the samples taken during the day showed more than a trace of sulphur dioxide in the flue gases.

DISCUSSION OF RESULTS.

Chart 1 shows a typical day's run and may be studied as representative of the performance of all switch engines around the Eighteenth street yards burning Pocahontas coal. Chart 2 shows

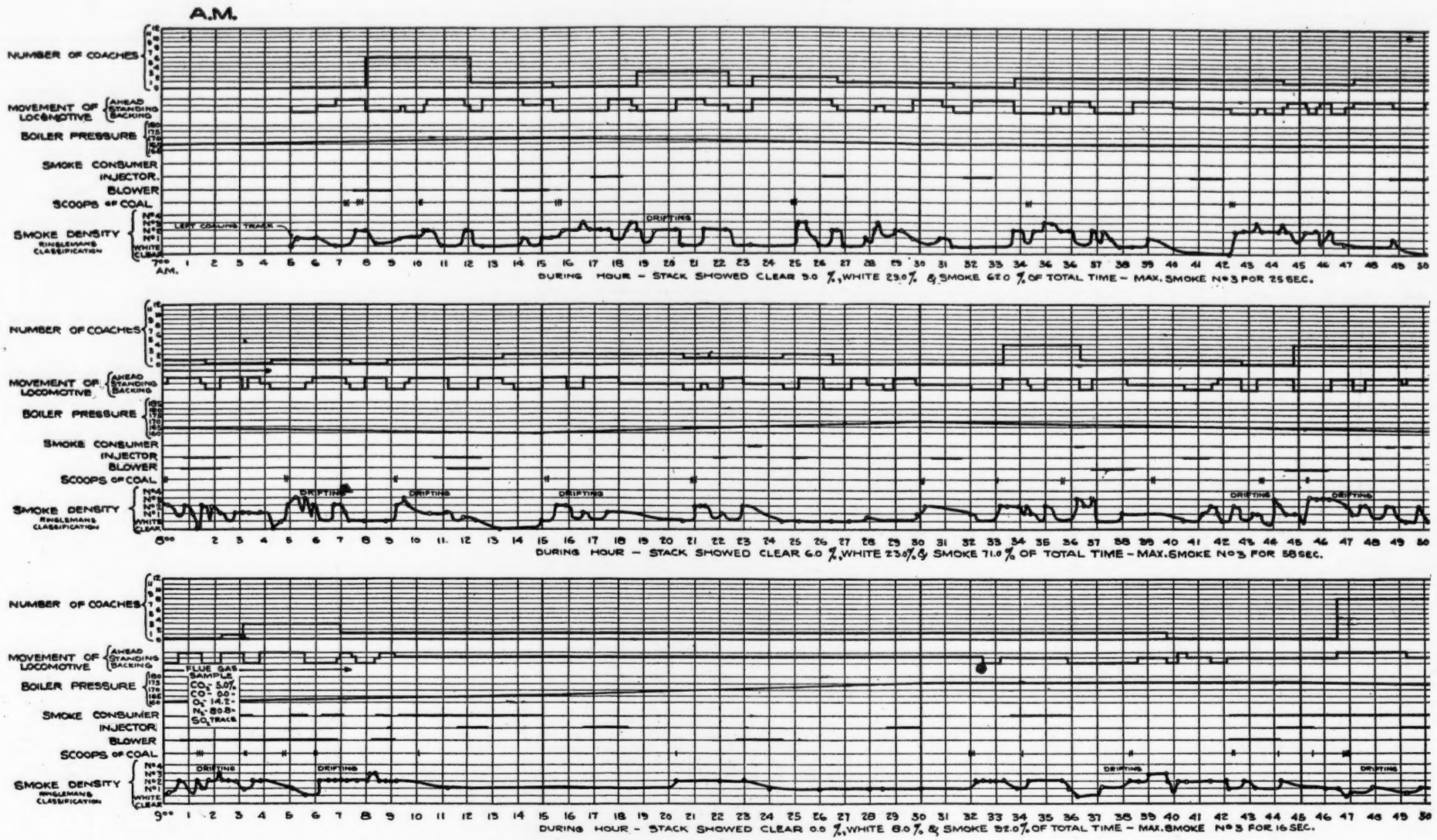

A.M.
NUMBER OF COACHES
MOVEMENT OF LOCOMOTIVE
AHEAD
STANDING
BACKING
BOILER PRESSURE
SMOKE CONSUMER
INJECTOR.
BLOWER
SCOOPS OF COAL
SMOKE DENSITY
RINGLEMANN'S CLASSIFICATION
WHITE
CLEAR
LEFT COALING TRACK
DRIFTING
7:00 A.M.
DURING HOUR - STACK SHOWED CLEAR 9.0 %, WHITE 29.0 % & SMOKE 62.0 % OF TOTAL TIME - MAX. SMOKE No 3 FOR 25 SEC.
8:00
DURING HOUR - STACK SHOWED CLEAR 6.0 %, WHITE 23.0 % & SMOKE 71.0 % OF TOTAL TIME - MAX. SMOKE No 3 FOR 58 SEC.
FLUE GAS SAMPLE
CO2 - 5.0%
CO - 0.0 -
O2 - 14.2 -
N2 - 80.8 -
SO2 TRACE
9:00
DURING HOUR - STACK SHOWED CLEAR 0.0 %, WHITE 8.0 % & SMOKE 92.0 % OF TOTAL TIME - MAX. SMOKE No 3 FOR 16 SEC.

Chart 2—Typical Half Day's Performance of Santa Fe Switching Locomotive 2024 in Regular Service in the 18th Street Yards, Chicago, and Burning Illinois Coal.

a typical day's run with the same engine, but burning Illinois coal. The advance made by the Santa Fe in smoke abatement, since the introduction of Pocahontas coal as regular fuel, on all engines in Chicago, two years ago, may be readily noted by a study of Chart 1 in comparison with Chart 2.

The short duration of smoke when Pocahontas coal was used is particularly noticeable, owing to the rapid transition of smoke density from a condition of "smoke" to "clear" or "white." The analysis of the flue gases shows very complete combustion of gases for both fuels. This condition is to be expected on locomotives in this class of service, where the work is comparatively light and it is not necessary to force the fire at any time during the day. The large percentage of oxygen present in the flue gases, shows that a large excess of air was admitted so that the gases are highly diluted. This condition accounts for the low percentage of carbon dioxide.

The recorded results show that the total smoke from switch engines is much less in intensity from the use of Pocahontas than from the use of Illinois coal, and the duration of the maximum density period of smoke is much shorter. The stack showed "white" for 34 per cent. of the time with Pocahontas coal, as against 18 per cent. of the time with Illinois coal. The stack showed "clear" 42 per cent. of the time with Pocahontas coal and only 2 per cent. of the time with Illinois coal. It showed "smoke" 24 per cent. of the time with Pocahontas coal as against 80 per cent. of the time with Illinois coal.

The analysis of the gases showed no poisonous carbon monoxide gas present at any time for either of the coals. A large per cent. of excess air insuring complete combustion was present at all times. There were traces only of sulphur dioxide in all samples of gases from both coals.

The evaporation per pound of fuel was greater for Pocahontas than for Illinois coal, being only 85 per cent. as much for the latter as for the former coal. The fuel consumption per hour was light, averaging 386 lbs. for the Pocahontas and 457 lbs. for Illinois coal. The amount of cinders thrown from the stack was small, being only about 16 lbs. per ton of coal fired.

The steam jets were rarely used when burning Pocahontas coal; they were frequently used in order to hold down the density of the smoke when burning Illinois coal. In general the results of the test indicate a very decided reduction in total amount of smoke from the use of Pocahontas instead of Illinois coal.

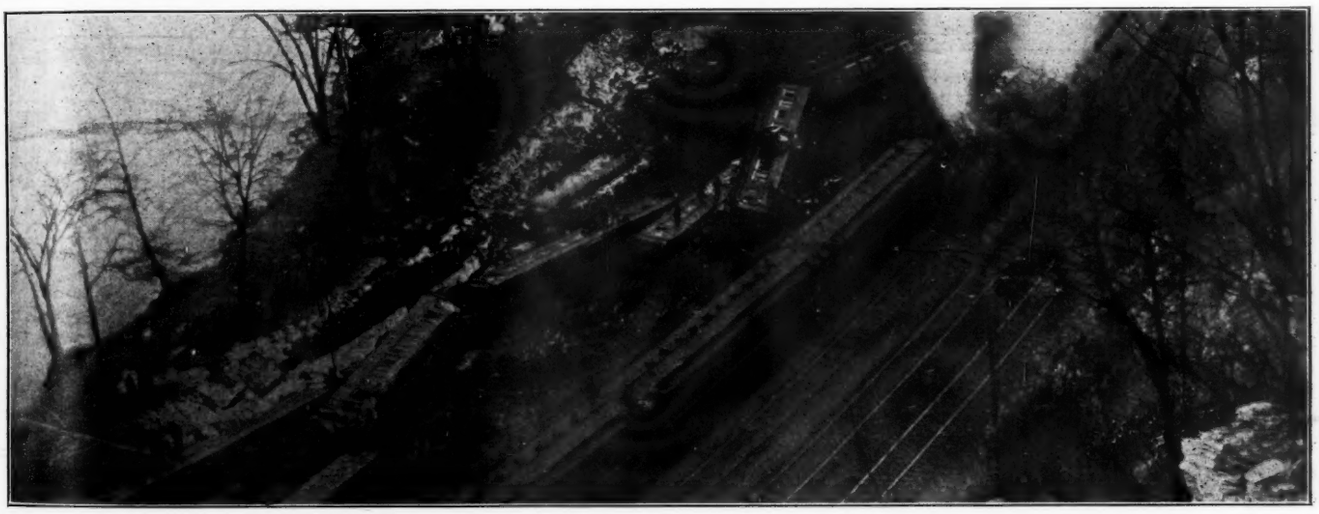
The permanent survey of the North Coast Railway, New South Wales, has been completed from Maitland to South Grafton.

DERAILMENT AT WARRIOR RIDGE, PA.

At Warrior Ridge, Pa., four miles west of Huntingdon, on the middle division of the Pennsylvania, on Thursday, February 15, at 11:52 a. m., an eastbound express train, the "Pennsylvania Limited," No. 2, was derailed by the breaking of a truck, and five persons were killed or fatally injured. There were about 100 passengers on the train, of whom about half were injured. The passenger cars were all overturned and the escape of such a large proportion of the passengers is attributed to the strength of the cars, which were of steel.

The train consisted of two locomotives, a postal car, a combination baggage and smoking car, two dining cars, three sleeping cars and a compartment observation car.

The part that failed was a broken lower arch bar of the right hand side of the forward truck of the tender of the second locomotive of the train, engine number 3350. The breaking of the arch bar caused the column bolt to break and allowed the arch bar to fall below the level of the rail. It wedged itself between the switch and stock rail at the Warrior Ridge water station, breaking five feet off the switch rail and canting the stock rail outward. This caused all the wheels back of this truck to be derailed, and the train left the track, with the exception of the postal car next to the engine, which with the rear truck of the tender re-railed themselves a short distance east of the derailment. The cars which left the track fell down a slope at the right of the tracks, some thirty feet.



Wreck on Pennsylvania Train No. 2 at Warrior Ridge, Pa., February 15.

Two passengers and three employees were killed or fatally injured and about sixty passengers and employees were injured, these employees being nearly all cooks and waiters in the dining cars. The train was running about fifty miles an hour. All of the derailed cars were of steel and while not much broken, parts of them were bent and badly damaged.

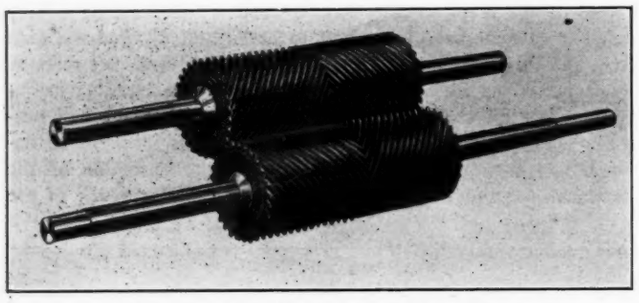
A picture of the wreck, taken from the high bluff at the left of the roadway, is reproduced herewith. Some of the cars lodged on the ice in what was formerly a lock of the old Pennsylvania canal. In the cars worst wrecked, the dining car and one other, much damage was done by one or more trucks being forced through the floor. It appears that all of the killed were in these two cars.

The official inauguration of the Treinta y Tres eastern extension of the Central Uruguayan Railway took place early in November, in the presence of the ministers of the interior and public works. The completion of this railway will greatly assist in the development of the town of Treinta y Tres and the rich cattle and agricultural region tributary to the railway line.

A NEW TYPE OF STEAM TURBINE.

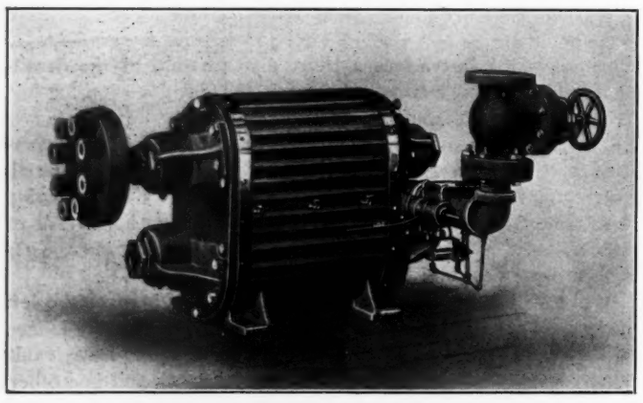
A new type of steam turbine, called the Spiro, has recently been placed on the market by the Buffalo Forge Company, Buffalo, N. Y. This turbine was invented by John H. Van Deventer, superintendent of the Buffalo Forge Company, who has been developing and perfecting it for the past three years, until now the Buffalo Forge Company is making it as a commercial product. Although small in size it has a large range of power, the one illustrated herewith being 185 h. p. At the present time, however, the commercial sizes range only from 1 to 50 h. p., non-condensing, but patterns are being completed to run these sizes up to 300 h. p.

The construction of the turbine is very simple, it consisting of two runners with herringbone teeth or vanes, the case of



Runners for Spiro Steam Turbine.

the turbine and the two heads which hold the runners. The vanes of the runner are cut from a solid cylindrical piece of steel with a special tool, which does away with all inserted vanes. The steam is applied at the center of the runner at the apex of the vanes being deflected so as to strike the vanes in the angle. As the vanes revolve the steam is pocketed between them and the casing, and in this pocket the steam expends and drives the runners. The maintenance of the whole outfit is slight, as the steam forms an elastic cushion between the vanes of the runners, which tends to decrease the wear. The leakage will be small between the vanes, as the difference in pressure between them will be small. The runner bearings, being in the heads of the turbine, will need no extensive packing, as they are surrounded with the exhaust steam. The lubricating system of the bearings is so designed that each bearing acts as an individual oil pump, cir-



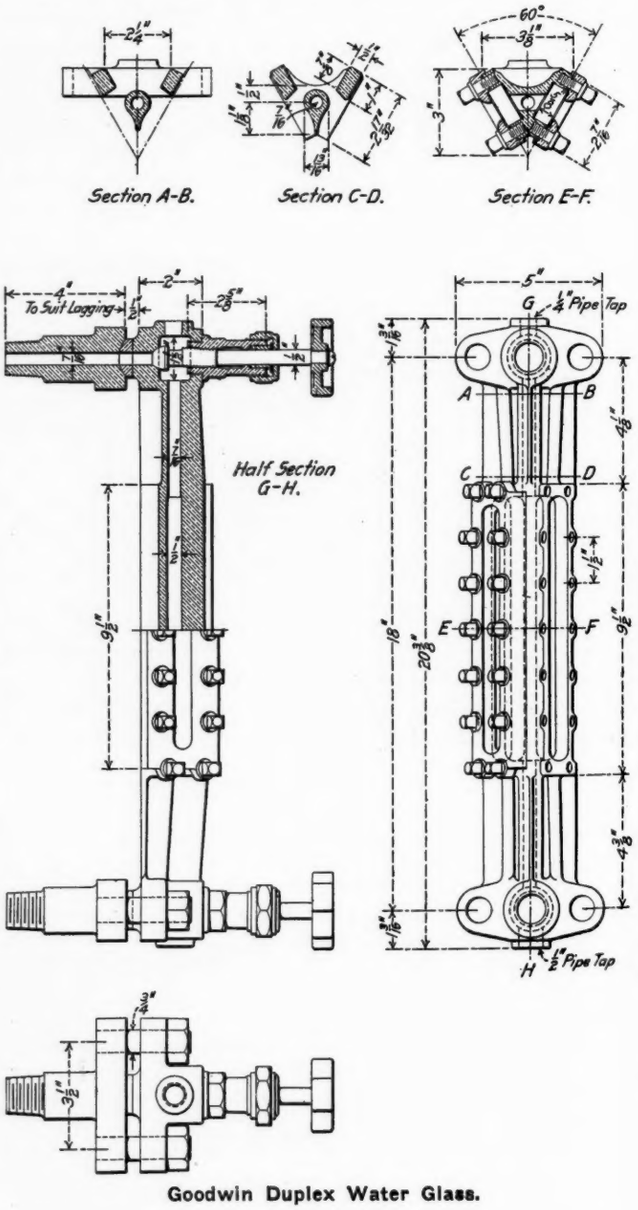
Spiro Steam Turbine, Rated at 185 H. P.

culating the oil through the bearing between the shaft and the bushing with a positive pressure. In this way an oil film is maintained as long as there is any oil in the reservoirs.

Tests which have been made on this type of turbine show that, with an initial pressure of 101.5 lbs., 25.3 h. p. was obtained at a speed of 2,450 r. p. m. The water used per brake horse power was 53.2 lbs. Another test, at an initial pressure of 115 lbs., showed 151 h. p. at a speed of 2,710 r. p. m., with a water consumption of 31.8 lbs. per brake horse power. Both of these tests were made non-condensing. The special uses for this turbine are the driving of fans and other similar machinery, for the larger sizes, and the operation of small hand drilling machines for the smaller sizes. The great power that is obtained from such a small machine is the chief advantage of this turbine.

GOODWIN DUPLEX WATER GLASS.

A high pressure water glass arranged so that both members of the locomotive crew can see the water level from any point in the cab without the use of mirrors, has been applied to the Pacific type locomotives recently built for the San Pedro, Los Angeles & Salt Lake. This water glass was designed and is being manufactured at the Los Angeles shops of the Southern Pacific. It has a number of advan-



Goodwin Duplex Water Glass.

tages in addition to its range of visibility. Plain glass, 5/8 in. in thickness, is secured in place in the same manner that the reflex glass usually is. The connection to the boiler fittings is made with ground joints, each end of the frame holding the glass being secured by two studs, eliminating the necessity of using any gaskets or nipples. A special ball washer is provided for the joint which can be easily ground in place. The material throughout, except the small studs, is of brass.

General News Section.

The Chicago, Milwaukee & Puget Sound has announced its intention of erecting two hotels for the accommodation of tourists, one on Mount Tacoma and another at a point on Puget Sound not yet announced.

F. A. Delano addressed the Chicago Real Estate Board on February 15 on the subject of Chicago railway terminals, with particular reference to the proposed plans for a passenger station at Twelfth street.

An attempt was made to hold up Vandalia train No. 11 near Liggett, Ind., on the night of February 17 by men who flagged the train and shot at the engineman and fireman. When the former escaped they left without robbing the train.

During the year 1911 the Pacific Fruit Express Company used in refrigerator car service on the Southern Pacific 1,467,433 cakes of ice, each 39 in. long, 22 in. wide and 11 in. in thickness, the whole weighing 220,115 tons. This quantity would make 11,006 carloads of 20 tons each.

The Bessemer & Lake Erie, having a light freight business because of the suspension of lake ore traffic, has lent ten freight engines to the Erie, for use on the line between Marion and Chicago; and 15 enginemen and 15 firemen of the B. & L. E. are serving temporarily on the Erie.

A bill has been introduced in the lower house of Congress to establish an Alaska railway commission, of three members, to carry out the recent recommendation of President Taft that the government undertake surveys looking to the construction of a railway to develop the coal and other resources of Alaska.

John W. Skeele, vice-president of the old Lehigh Valley Coal Company, has been elected president of the new Lehigh Valley Coal Sales Company, which was recently organized, as noted in these columns under Financial News; this to comply with the commodities clause as interpreted in recent court decisions.

C. C. Tegethoff, J. W. Harriman, A. G. Hackstaff, and W. H. Averill have been elected directors of the United States Express Company, representing the interests of the estate of the late E. H. Harriman who, about four years ago, bought 22,000 shares of the company's stock from the Adams and American Express companies.

C. H. Middleton, formerly assistant to the vice-president of the Missouri Pacific, has been engaged by the Colorado state board of equalization to make an appraisal of the value of the Atchison, Topeka & Santa Fe in the state, to be used as evidence in suits brought by the Santa Fe contesting the correctness of appraisals made by the board.

The Employers' Liability Commission has completed its report and submitted it to the president, who, on Tuesday last, sent it to Congress with the recommendation that the bill proposed by the commission be enacted. The tentative proposals of the commission were noticed in the *Railway Age Gazette* of December 15 last, page 1201.

The Pere Marquette has reduced the working time in its shops at St. Thomas, Saginaw, Grand Rapids and Ionia from six 9-hour days a week to five 8-hour days a week. The company has also withdrawn from service one passenger train between Lansing, Mich., and Grand Rapids, and two trains between Grand Rapids and Detroit, in the interest of economy.

The Saginaw (Mich.) board of trade has addressed a protest to the attorney-general of the state asserting that the service rendered by the Pere Marquette is inadequate and that its financial condition is such that it is impossible for it to provide needed improvements. The attorney-general was asked and has promised to make an investigation of the expenditure of the proceeds of recent bond issues.

Verdicts against the Canadian Pacific for damages done in Maine in the year 1898 by forest fires set by sparks from locomotives, and which have just been made public, will aggregate $139,400. The cases have been a long time in trial in the United States district court at Portland, Me. The damages awarded are about 50 per cent. of the amounts claimed, and about twice as much as the railway asserted the damage to be. These were test cases representing perhaps half of the losses from the fires in question.

The number of fires on the property of the Pennsylvania Railroad system during 1911, as reported by an officer of the company, was 891, from which the loss was $304.975. The measures taken by the company to prevent fires and to reduce the loss therefrom have been very successful, and there has been a steady increase year by year in the number of fires extinguished by employees. During the past year 43 fires were put out by the apparatus carried on yard locomotives. A circular has been issued for the information of the employees giving the causes of fires during the past years.

In accordance with a resolution passed at the annual meeting of the National Association of Railway Commissioners, President C. F. Staples has appointed a committee to make an investigation of rails and railway equipment used in the United States and to report whether or not the quality may be improved. The committee is composed of James E. Sague of the Public Service Commission of New York, Second district, chairman; W. J. Wood, chairman Indiana railway commission, and Charles Elmquist of the Minnesota commission. The committee intends to hold several hearings in different cities.

The westbound Pennsylvania Limited ran into the rear of a preceding work train near Larwill, Ind., on the Pittsburgh, Fort Wayne & Chicago, early on the morning of February 17, and five track employees were killed and 10 injured. The work train had been stopped because of a broken rail in the track ahead of it and the workmen were eating their breakfast in the caboose. There was a dense fog at the time and it is said that the passenger train had run past a block signal set against it and also past a flag sent back from the work train. The passenger train was made up of steel cars, and the baggageman was the only person on it who was injured. The wreck took fire and the bodies of two of the dead were badly burned.

In the Penobscot County Supreme Court at Bangor, Me., former conductor H. G. Dibblee has been fined $500 and sentenced to 60 days in jail, for the crime of manslaughter in connection with the collision of July 28, last, on the Bangor & Aroostook, near Grindstone, Me. As conductor of an excursion train, he ran his train past a meeting point designated by the despatcher. The first attempt at indictment proved abortive, but Dibblee was indicted at the next term. There have been several other attempts to punish railway men in Maine for manslaughter, but this is said to be the first case in which a sentence has been secured.

The Grand Trunk Pacific has "train agents" to collect fares, and the conductor keeps his hands off. According to a correspondent of a Montreal paper the G. T. P. train agent is notable for his extreme politeness to and consideration for his passengers. This correspondent says "In the West today, the 'train agent' steps up to you and makes a pleasant remark upon the weather, or bids you 'the time of the day,' and concludes with 'your ticket, please.' He waits patiently till he gets it, and then invariably says: 'Thank you.' If you are going far on the train, he will tell you about the hour you will get to your journey's end. If your trip is short he will tell you two, three, or four stations, as the case may be, and hand you a hat check. I watched the first 'train agent' I traveled with and he treated every passenger in the car in the same courteous manner. It was pleasing to see it, and I tell you it pleased the travelers a mighty sight better than the old-time poke in the ribs."

Railway Presidents Not Mouthpieces of Wall Street.

Darius Miller, president of the Burlington, in a recent newspaper interview, gave emphatic denial to an assertion by former Senator Flint of California, that railway presidents are mere mouthpieces for Wall street. Mr. Miller said:

"The stock ticker does not form a part of the furniture of a

great railway office, and the presidents of the roads do not serve as mouthpieces for Wall street.

"It is a mistake for anybody to assume that railway presidents are mere clerks for Wall street interests. The railway president of today is just as much a president de facto as he ever was. He is elected to operate a railway in all its branches and in the interests of the public and of the stockholders.

"It is a mistake to presume that because one is president of a railway he is also the financial controller. The actual operation of a big system comes ahead of all else. By operation I mean not only the running of trains but the solicitation of traffic and the manifold duties to the public. The president is elected to represent the stockholders, as a senator or congressman is elected to represent his constituents. The financial interests back of a road must necessarily rely for results on those actually managing the property.

"Railway managers are not guilty of running their systems to suit the stock market. I do not think you will find in any of the great Chicago railway offices a ticker or other paraphernalia of the stock market. The financial gambling element in this country works night and day, and the rumors and reports created and circulated by it to boost or injure a railway are not the least of the troubles of those in charge of our transportation interests."

Unfilled Tonnage of the Steel Corporation.

The report of the United States Steel Corporation shows that the unfilled tonnage on January 31 was 5,379,721 tons, an increase of 294,960 tons over the previous month. Shipments during the month were a little over 875,000 tons, or at the rate of 28,227 tons a day. The unfilled tonnage of January is the highest since March 31, 1910, when it was 5,402,514.

Proposal for a Government Railway in Alaska.

President Taft, in a special message sent to Congress Feb. 2, recommending the leasing of mineral lands in Alaska, expresses the opinion that the government should build a railway to open the mineral treasures of Alaska to the people who live along the Pacific coast. The message says in part:

"The construction of a railway and ownership of the fee do not necessitate government operation. Pursuant, however, to the recommendation of the Secretary of the Interior, I suggest to Congress the wisdom of providing that the President may appoint a commission of competent persons, including two army engineers, to examine and report upon the available routes from Seward to the Matanuska coal fields [150 to 200 miles], and into the Tanana and Yukon valleys, with an estimate of the value of the existing partly constructed railway and of the cost of continuing it to the proper points in the valleys named. This proposal is further justified by the need that the navy of the United States has for a secure coaling base in the North Pacific. The commission ought to make a full report also as to the character of the coal fields at Matanuska, and the problem of furnishing coal from that source for mercantile purposes after reserving for government mining a sufficient quantity for the navy."

The President is not in favor of government ownership where the same certainty and efficiency can be had by private enterprise, but he regards the situation in Alaska as exceptional; and a railway owned by the government can be leased on terms to be changed, as the territory is developed. The bondholders of the Alaska Central (now built over a part of the route), who are the real owners of that road, are willing to sell to the government.

The Value of Great Northern Ore Properties Estimated.

James J. Hill, in testifying before the Stanley steel committee, estimated that the Great Northern Ore properties were worth in the neighborhood of $500,000,000. He arrived at his estimate by the following method: There are 69,000 acres held by the Great Northern Ore trustees, of which only 39,000 acres have so far been worked, and Mr. Hill puts the amount of ore that can still be taken out at 500,000,000 tons. The ore can be sold at $3.40 a ton. Supposing it costs 60 cents a ton to mine, 60 cents a ton for rail transportation and 65 cents a ton for lake transportation; this would make the cost $1.85, leaving a profit of $1.55 a ton. The rail rate, however, is now 80 cents a ton, but is to be reduced to 60 cents in the near future. Mr. Hill estimated, therefore, that a dollar a ton for the 500,000,000 tons is a conservative estimate of what the property is worth. Mr. Hill testified that he paid $4,050,000 for the property and turned it over to the trustees of the Great Northern Ore for the same price, and these trustees issued certificates of participation to holders of Great Northern railway stock pro rata.

A Cool Porter.

"It was just like Dante's inferno," declared Milton Epstein of Fort Worth. "Everybody around me seemed to have cut faces. I had never seen so many bleeding people before. I saw one woman, a negress, lying dead beside the overturned dining car. She had been thrown through a window."

"In the third car of those that overturned," said E. E. Rogers, of Chicago, "we had a porter that was a brick. As we tilted over to one side he grabbed an end door and forced it open. 'Bad thing if the door should jam,' he said to us.

"I went down on the floor and I saw a woman lying near me, too much hurt to get up. After we quit rolling we were on our side. There was a row of seats, all on edge, leading from me to the door. 'This way out,' called the porter, 'step lively, please,' and that started a laugh in the car. Everybody got his wits together, and the women even quit crying to laugh. One little boy trilled out a treble cry, and that was all. I packed my suitcase and walked down the line of seats and out of the door. I believe if that porter had had a brush he would have brushed us off. He offered to take my grip."—*Report of Wreck at Warrior Ridge.*

Elimination of Grade Crossings at Wilkinsburg.

It is announced that the dangerous grade crossings on the main line of the Pennsylvania at Wilkinsburg, Pa., seven miles east of Pittsburgh, are to be done away with by changes of grade involving the construction of several overhead bridges and a short tunnel, the total expenditure to be about $1,000,000. It is said that the railway company will bear four-fifths of the cost and the borough one-fifth. This improvement has been the subject of negotiations for several years.

Disastrous Collision in Hoosac Tunnel.

The Hoosac tunnel of the Boston & Maine (five miles long) was blocked on February 20 by a rear collision, followed by a fire, which killed four men and filled the east half of the tunnel with smoke so dense and heat so intense as to prevent any attempt at immediate clearing of the tunnel. A freight train of 32 cars was stopped about 2,500 ft. from the east portal, and the rear brakeman went back and flagged a following passenger train. The brakeman got aboard the electric locomotive of the passenger train, but for some unexplained reason the train was not controlled and crashed into the freight train. Fire immediately broke out and the engineman of the steam engine of the passenger train had to back away immediately to save his train. The engineman of the electric locomotive and his assistant, an apprentice and the brakeman of the freight train were killed. Passenger trains are run through the Hoosac tunnel by having an electric locomotive coupled on in front of the steam locomotive of the train. No passengers were seriously injured. The collision occurred on a descending grade.

Disk Signals.

Many roads are still installing the enclosed disk signal. The enclosed disk signal has done very good work in the past, and continuing to do good work. Many roads prefer it to the semaphore as a distinctive block signal. The record of the enclosed disk signal is one that I venture to say will never be equalled. It is a wonderful record, and I have every belief that it will continue. It is simplicity itself.

I do not believe it necessary to indicate or mark an automatic signal by a marker light. The staggered light, that is, the red marker light, as an identification for an automatic signal is not always a necessity.—*H. S. Balliet,* at N. E. R. R. Club, Boston.

Remarking on Mr. Balliet's favorable mention of the enclosed disk signal, the president of the club, J. A. Droege, superintendent of the New York, New Haven & Hartford, at Providence, and formerly on the Lehigh Valley, observed that in his opinion this

type of signal was more reliable than the motor-operated semaphore; it could be installed for 40 per cent. less, and could be maintained for 40 per cent. less.

Accident Record—Correction.

In the derailment at Kissimmee, Fla., December 1, reported in the *Railway Age Gazette* of January 26, page 154, no person was killed and the injuries of the baggage man, the only person who suffered anything more than a trifling injury, were not serious. The accident was due to a broken rail. An officer of the company informs us that no passenger has been killed while riding in his proper place on any train of the Atlantic Coast Line in the state of Florida since the A. C. L. absorbed the Plant System, July 1, 1902. The length of the company's lines in Florida is about 1,500 miles, and the passenger business is heavy.

Frost on Signal Apparatus.

As far back as 1903, on the Lehigh Valley, we went through some severe sieges of frost. Great bonfires were built alongside of signal masts to try to fry out the frost. Alcohol was burned and other chemicals used to keep frost away. You can do nothing to beat frost unless you get on the right side of nature. Every piece of apparatus that we have on a railway, I am convinced, the more we try to seal it, close it up and stop it from breathing, as I call it, in other words, keep it air tight and thereby, as we believe, moisture proof, the more clearly does it appear that our efforts are of no avail. If the sun's rays get at that piece of mechanism at the right slant you will have frost and your relay armature will be frozen regardless. There is no way of getting away from the sun's rays, it can be on a cloudy day as well as on a clear day; the only way to get away from it is to study your local condition and move your apparatus away from those direct rays.—*H. S. Balliet.*

Signaling at the Grand Central Terminal.

The subject of the January meeting of the New England Railroad Club, at Boston, January 9, was railway signaling. The principal paper was by J. M. FitzGerald, engineer of maintenance of signals of the New York Central. Mr. FitzGerald gave a very full description of the elementary features of block and interlocking signals, and illustrated his paper with stereopticon views, a feature of these being a comprehensive exhibit of the aspects, old and new, now in use on the New York Central. These aspects are set forth in detail in a new book of rules on the operation and use of signals which has just gone into effect.

In the discussion of the paper the principal speaker was H. S. Balliet, signal engineer of the Electric division of the New York Central. Answering a question as to what, if any, difficulties were experienced in training enginemen in quick reading of the new and old aspects, Mr. Balliet said:

We have not one employee on the electric division of the New York Central who cannot stand right up and explain every one of those cuts to you offhand. It has not been a hard job. It is not difficult. There are only a few things to remember. Top arm always the main line. Middle arm always a diverging route at medium speed. Lower arm all other diverging routes. It doesn't matter where he sees the picture, be it day, be it night, he can always knows what it means.

Answering a question as to the cost of the elaborate protection provided at the new Grand Central terminal, Mr. Balliet said:

A track circuit in the simplest form—that is, a track circuit controlling one of these electric locks for an interlocking plant, will cost approximately $50. Those track circuits with the electric locks are giving us a great deal more protection than all the interlocking or so-called detector bars that we ever had. In other words, they are great long detector bars. . . . At the Grand Central Terminal we have perhaps found the hardest job of signaling that has been undertaken in the United States, because we have to handle all that big traffic, and keep the trains going. We have now in service the two largest electric interlocking machines in the world, one 360 levers, and the other 400 levers. The 400 lever machine is going to control ultimately twenty-three acres of tracks, all as dark as night—in other words, all covered up on the lowest level that we have in that station. We do not have in that terminal one frill. We have removed all detector bars from our switches and substituted therefor electric switch locking, with which switch locking we give the indications to the man who operates the levers. There is a light over the lever which gives him the information that the lever is free to be operated. The director sits on a chair at a table; he doesn't run round the building like a wild man, as he used to, or hang out of the window and holler to the trainmen, but he sits down like a quiet, decent person and looks at a picture which has a lot of lights on it. This says, "Mr. Director, the route from this track to the station track is clear—move your trains." That track circuit does three things: it ensures the switches being thrown properly, *i. e.*, it protects the lever man from operating his lever incorrectly, in addition to locking it, and it tells the director that the way is clear or occupied; so that whatever it costs us for track circuit we can divide by three.

Of course this is in electrified territory, and the devices are pretty complicated. Mott Haven Junction, which was shown on the screen, is an electro-pneumatic plant. That plant was left in its original condition, except that bars were removed and detector circuits substituted at a cost not to exceed $125 per circuit. And the number of circuits is very limited, so that we won't have much trouble in earning the interest on the investment at that point.

The B. L. W. Loyal Legion.

The Baldwin Locomotive Works, Philadelphia, Pa., has instituted the B. L. W. Loyal Legion as a form of recognition of the loyal and faithful service of all its employees who continued in the active service of the company during the strike last June in spite of the extreme pressure that was brought to bear to make them become disloyal, including intimidation and personal violence. Each member has been given a solid gold button containing in the outer rim the words "B. L. W. Loyal Legion," and in the center, in gold figures on black enamel, the number of years of faithful service rendered by the recipient. The accompanying illustration shows this button, actual size. These tokens of appreciation and good will by the employers have been highly appreciated by those entitled to them and have served to create a certain rank based upon loyalty and service. The numbers are to be changed each year, as the center of the button is removable. The total force at work on February 13, 1912, was 8,543 men, and the number enrolled in the legion was 3,562, or 42 per cent. of the total force. This enrollment includes commercial and engineering officers and technical staff, as well as the workmen employed in the shops. It comprises 2,055 men who have served faithfully and continuously for from one to 10 years; 936 men from 11 to 20 years; 390 men from 21 to 30 years; 132 men from 31 to 40 years, and 49 men from 41 to 50 years. There are 11 men who have been employed upwards of 50 years, the senior in point of employment being George Johnson, a traveling engineer, who has been continuously in the service of the company for 62 years, and is still at work. The percentage of the members of the legion to the total number of employees is, of course, subject to fluctuation, as the working force is continually changing. Men who enter the service of the company in future will not be eligible to the legion unless a similar emergency should test their faithfulness and loyalty.

Rail Hearing at Indianapolis.

The Indiana State Railway Commission held the first of a series of hearings on the rail situation at Indianapolis, on Tuesday, February 20. About twenty prominent railway operating officers and engineers, together with representatives of the large steel companies, were present, on the invitation of the chairman of the commission. At this hearing, testimony general in nature was offered by the representatives of railways and manufacturers regarding investigation work already done. Chairman Wood of the commission was explicit in his statement of the desire of the commission to assist in the work now being done by the American Railway Engineering Association, and urged the greatest co-operation between manufacturers and railways in view of the large number of rail breakages during the past two months. Papers prepared by Dr. Dudley, of the New York Central Lines, and Thomas Johnson and W. C. Cushing, of the Pennsylvania

Lines, outlining the early history of rails, the American Society of Civil Engineers' investigations, and the work of the American Railway Engineering Association, respectively, were read. Mr. Cushing emphasized the fact that study of chemical properties was not conclusive regarding the quality of rails and favored leaving the chemical properties to manufacturers, because of their greater experience; but railways should emphasize physical tests. Mr. Cushing also urged that an indefinite per cent. of discard is ample in one case, while 50 per cent. is not sufficient in another case. He believes it would be better for railways to test the finished product then to specify methods of manufacture.

F. A. Delano, of the Wabash, urged great care in reaching conclusions and outlined past experiences in the development up to conditions of today.

E. J. Buffington, president of the Illinois and Indiana Steel Companies, denied that the quality of steel made in this country today had deteriorated, and stated that manufacturers are making better steel than ever before, because of more scientific management. He urged great co-operation between manufacturers and railways, and realized that the manufacturer as well as the railway has a responsibility to the public. In reply to questions of the commisison, Mr. Buffington stated that the cost of manufacture of rails was $22.30, and the selling price $28. He also stated the manufacturer replaces broken rails whenever a fault is proved in manufacture. He said that Mr. Farrell's testimony before the Congressional committee was personal opinion and that he did not agree with Mr. Farrell. He would not recommend a change to heavier section or a change in carbon content with present information. He believed more failures are reported today because railways are watching the subject more closely and not because of poorer material.

The commission is preparing blanks to be sent to railways in the state for data on broken rails, and will compile its own information. The hearing was adjourned until Tuesday, April 2, at Indianapolis.

Motive Power on the Chesapeake & Ohio.

A striking example of the tendency to reduce operating costs by taking advantage of the latest improvements in locomotive design is furnished in the development of motive power on the Chesapeake & Ohio during the past two years. With the recent order from the American Locomotive Company, noted elsewhere in this issue, of 24 mikados and 25 Mallets of the 2-6-6-2 type, this road has, during the above period, adopted three new and interesting types of motive power for freight and passenger service. The mikados are duplicates in design of the single trial engine described in the *Railway Age Gazette* of February 2, 1912, page 201, while the Mallets are the same as the previous design, described in the *Railway Age Gazette* of December 16, 1910, page 1144, except for an increase of 20,000 lbs. in weight. Traversing low-grade districts along the river bottoms and heavy grade districts over the Blue Mountain ranges, the operation of this road presents diversified and difficult problems. The Mallets of the 2-6-6-2 wheel arrangement are equipped with superheaters and have a total weight of 400,000 lbs. and a normal tractive effort of 73,200 lbs. Twenty-five of these have replaced 44 consolidations, having a tractive effort of 41,140 lbs. each, in road service on the Allegheny district. This section includes a 12-mile, 30-ft. grade in one direction and a 60-ft., 15-mile grade in the other, in addition to sustained grades averaging 21 ft. to the mile.

The new mountain type locomotive described in the *Railway Age Gazette* of September 22, 1911, page 555, was designed to meet the difficult requirements of passenger service on the Mountain District between Clifton Forge and Charlottesville. On this section, long ascents of 75 and 80 ft. to the mile are encountered in both directions. These locomotives weigh 330,000 lbs., have a tractive effort of 58,000 lbs. and are equipped with superheaters, brick arches and mechanical stokers. For road freight service on the low grade divisions the mikado has been designed to haul 4,000 tons on a .3 per cent. grade at 15 miles an hour and is the most powerful locomotive of its type yet developed. It is practically a conversion of the mountain type into a mikado by the substitution of a 2-wheel for a 4-wheel leading truck, thereby giving a wide interchangeability of parts between the two. In each case thorough analysis of the operating and physical conditions of the division on which the locomotives were to be used has been made by the motive power officers in conjunction with the builders prior to developing the design, and only one or two locomotives have been ordered for trial purposes; and these have been thoroughly tried out before any large amount of money has been invested. It is significant that additional locomotives have been subsequently ordered in each instance. Records for eight months' service of the Mallets show that they are saving 5.7 cents per 1,000 ton-miles in the cost of handling the traffic. The mountain type locomotives are handling 600- and 700-ton trains on the same schedule that the Pacific type could barely make with a 350 ton-train, thereby saving double-heading always expensive. In recent dynamometer tests, the mikado type has developed a maximum draw bar pull of 27,000 lbs. at a speed of 33 miles an hour. The aim has been to secure the greatest possible economy in operation, not only or primarily through the application of approved fuel-saving devices, but also from the elimination of double-heading, pusher service and from the operation of fewer and heavier trains.

Charles Schwab's Rules for Depreciation.

Charles M. Schwab in addressing the Easton (Pa.) board of trade, talked of the development of the steel business, the economies of production, the necessity for cheap, transportation and the control of ore supplies. He said the actual return over five years for the capital invested in the Bethlehem plant was 4.60 per cent., and that in view of depreciation, maintenance, necessary expansion and the replacement of obsolete machinery, a steel company which was earning from 15 per cent. to 20 per cent. had no right to pay more than a third of it in dividends. He added that a company which paid up to the hilt was already on the down grade. He told how only twenty-four years ago he persuaded Mr. Carnegie to let him build a rail mill at Braddock, and that he wrote to his employer enthusiastically of an output of 1,000 tons of rails a day, for that $1,000,000 investment. Mr. Carnegie wrote saying he would have been allowed no rest if the mill had not been built, but that he would not like people to think that he contemplated a day when the United States would require 1,000 tons of rails a day. The capacity of 1911 was 15,000 tons a day.

Mr. Schwab said that something like $38,000,000 had been put in the Bethlehem Steel plant, of his own and other people's money, and that he found nothing he had done in the steel business was so laborious as financing it; and then he made about as frank a statement as any great captain of industry has put before a public audience with reporters in the room He said that practically all he had was in the property; and that in the five years he had been intimately associated with it, living with it and working for it all the time, he had never taken from it one penny in fees, personal expenses or dividends.

He claimed that with an average wage of $788 a year, taking the men and boys together, and excluding the office staff, the Bethlehem Steel Co. was paying the highest wages of any industry with which he was acquainted, and that he hoped and expected to see the wages increase as prosperity broadened. He expected to pay higher wages, and thought that the upbuilding of the property came far ahead of dividends.—*Wall Street Journal.*

Enginemen's Demands in Eastern Territory.

A committee of thirteen has been appointed by the eastern railways to meet representatives of the Brotherhood of Locomotive Engineers to discuss the requests for higher wages. The committee is as follows: J. C. Stuart (Erie), chairman, A. W. Thompson (B. & O.), W. G. Besler (C. of N. J.), C. S. Sims (D. & H.), M. S. Conners (H. V.), C. E. Schaff (L. S. & M. S.), A. H. Smith (N. Y. C. & H. R.), H. J. Horn (N. Y., N. H. & H.), J. A. Shepard (West. Md.), B. A. Worthington (W. & L. E.), S. C. Long (Penna. Lines East), G. L. Peck (Penna. Lines West), J. A. McCrea (Long Island), A. W. Sullivan, chairman of the Committee on Railway Mail Pay, is secretary of the conference committee.

The enginemen submitted uniform wage scales to each of the 49 roads east of Chicago and north of the Norfolk & Western, which road has just increased the pay of its enginemen. In transmitting a copy to Mr. Stuart, as chairman of the eastern General Managers' Association, Grand Chief Stone of the brotherhood said:

"We believe that the engineers are entitled to an increase of wages at this time owing to the constantly increasing demands

being made upon them. It is true they were granted an increase of from seven to ten per cent. at the time the conductors and trainmen received their increase of 18 to 51 per cent., but this being the case you can readily understand why the engineers are not satisfied with their present wage condition. The conductors and trainmen have a standard wage throughout the eastern territory, and in many cases are paid a higher wage than the engineer.

"We are taking up this wage movement with a desire to standardize the wages of the engineers, and in doing so we desire to handle same in a concerted movement and address this to you as chairman, asking that you take this question up with the roads named on the enclosed list and ask them to select a committee of managers to handle the question.

"We do this believing a concerted action is best for all parties concerned, as it saves time and makes a standardization of wage scale. In dealing with the operating officials of each individual road it takes far more of their time and in the end the results are practically the same."

The committee has called on the roads concerned to prepare figures showing what would be the results of putting the proposed scale in effect. Roughly, it is estimated that the aggregate increase would be $10,000,000 a year. The percentages of increase vary from 15 to 50 per cent. in different classes of work.

The proposed scale is as follows:

PASSENGER RATES.

Engines with cylinder of 20 in. or less in diameter, $4.40 per 100 miles or less. Engines with cylinders over 20 in. in diameter, $4.60 per 100 miles or less. Miles made in excess of 100, pro rata. Overtime in through passenger service to be computed on a basis of 20 miles per hour. Overtime to be paid for at 70 cents per hour.

ELECTRIC SERVICE.

Wherever electric service is installed or now in operation locomotive engineers will take the positions on electric locomotives or multiple unit trains under the prevailing schedules governing rates of pay and conditions in steam service. In any change from steam to electricity or other motive power in any form at any point on the system such power will be manned by engineers and paid according to the service for the territory affected, or where electric multiple unit trains enter upon steam tracks or tracks formerly operated by steam or where trackage rights are leased to holding companies they shall be operated by engineers operating steam trains on said tracks.

FREIGHT RATES.

Engines with cylinders of 20 in. in diameter or less, $5.25. Engines with cylinders over 20 in. in diameter and less than 24 in. in diameter, $5.50. Engines with cylinders 24 in. in diameter and over except Mallets, $5.75. Mallets, $7.

One hundred miles or less, 10 hours or less, to constitute a day's work. All over 100 miles to be paid pro rata. Overtime to be computed on a basis of 10 miles per hour, and paid for pro rata. Through freight rates to apply to all mine runs, work, wreck, pusher, or helper, milk, roustabout, and circus trains, according to class of engines. Overtime to be computed on minute basis. Engineers will be paid at overtime rate for all time over 15 hours held away from other than their home terminal. Twenty-five cents per 100 miles or less additional to be added to through freight rates for local freight service according to class of engines.

SWITCHING ENGINES.

Rates for engines in switching service, $4.50 per day. Ten hours or less to constitute a day's work. All over 10 hours to be paid pro rata. Overtime to be computed on minute basis.

BELT LINE SERVICE.

Engineers in belt line service will be paid $5 per day, 10 hours or less to constitute a day. All over 10 hours, 50 cents per hour. Overtime to be computed on minute basis. Engineers of single crew yard and belt line engines will report for duty at the appointed time and will receive one-half hour's pay in addition to the regular day's pay for reporting 30 minutes in advance of the commencement of the day's work. In case of double crew engines, if engineers do not relieve each other at the appointed time and the engineer of the next crew is required to prepare his engine, 30 minutes' pay will be allowed for same.

BEGINNING AND ENDING OF DAY.

In all classes of road service an engineer's time will commence 30 minutes before leaving roundhouse or designated track and will conclude at the time the engine is placed on the designated track or relieved by hostler at terminal.

INITIAL TERMINAL DELAY.

When delayed within the terminal as much as one hour beyond the time set to leave, engineers will be paid one hour's overtime at overtime rates according to class of engine. One hour and thirty minutes to constitute two hours, etc. If road overtime is made on same trip, initial overtime will be deducted.

FINAL TERMINAL DELAY.

Final terminal delay will be paid for at the end of the trip when delayed more than 30 minutes between yard limit boards governing yard to which train is to be delivered and the point of final relief, and to be paid for at the overtime rate according to the class of engine on the minute basis.

HOURS OF SERVICE LAW.

Amendment of Section E of the application of the sixteen hour law. Engineers in train service tied up under the law will be paid continuous time from initial point to tie-up point. When they resume duty on continuous trip they will be paid from the tie-up point to the next tie-up point, or to the terminal on the basis of a minimum day. It is understood that this does not permit running engines through terminals or around other crews at terminals unless such practice is permitted under the pay schedule.

It is understood that existing rates of pay or better working conditions shall not be reduced by the rates or rules hereby agreed upon, nor shall general committee of adjustment be debarred from taking up with their respective managers matters not decided at this conference.

New Officers of the Guantanamo & Western.

A syndicate made up of a number of the larger American stockholders of the Guantanamo & Western Railroad, Cuba, has secured a majority of the stock of that corporation, and has elected an entire new board of directors. This board has elected officers as follows: M. H. Lewis, president; G. St. L. Abbott, treasurer; I. McD. Garfield, vice-president, and D. H. Thomas, secretary. The Guantanamo & Western is a standard gage line 81 miles long, with an ocean terminal at Boqueron on the southern coast of the eastern end of the island. It connects at San Luis with the Cuba Railroad, exchanging traffic at that point to and from Santiago, Nipe and Havana. The territory between San Luis and Boqueron is a very fertile sugar cane district, and while only about 15 per cent. of it is under development the gross earnings of the railway during the fiscal year ended June 30, 1911, were more than $4,000 per mile.

Progress on the New Canadian Grand Trunk.

Frank Cochrane, minister of railways of Canada, has compiled a report of the progress of the National Transcontinental Railway, which estimates the capital cost of the road to January 1, 1914, as $187,781,128. Including the interest for the seven years during which the Grand Trunk Pacific is not required to pay interest, the cost is estimated at $236,000,000, or $140,800 per mile. Of the 1,804 miles from Moncton to Winnipeg grading has been completed on 1,587 miles, track-laying on 1,378 miles of main line and 278 miles of siding, 928 miles of telegraph line has been constructed and 82.75 per cent. of the bridges have been erected.

International Railway Fuel Association.

The fourth annual meeting of the International Railway Fuel Association will be held at the Hotel Sherman, Chicago, on May 22-25. The program, as announced, includes the following papers: "Standard Locomotive Performance Sheet," by R. Collett, superintendent locomotive fuel service, Frisco Lines; "The Use of Anthracite for Locomotive Fuel," by T. S. Lloyd, formerly general superintendent motive power and equipment of the

Delaware, Lackawana & Western; "Drafting of Locomotives to Obtain Maximum Fuel Efficiency," by H. B. McFarland, engineer of tests, Atchison, Topeka & Santa Fe; "Proper Method of Firing Locomotives" (illustrated with motion pictures and colored slides), by D. C. Buell, chief of educational bureaus, Union Pacific and Illinois Central; "Inspection of Fuel from the Standpoint of the Producer and Consumer," by J. E. Hitt and Glenn Warner, representing Burnwell Coal Company and Cincinnati, Hamilton & Dayton Railway, respectively; special paper by Prof. W. F. M. Goss, University of Illinois.

International Safety Congress.

The honorary committee which will represent the United States at the International Safety Congress in Milan, Italy, May 27-31, will be composed of James McCrea, president of the Pennsylvania Railroad; E. A. S. Clarke, George B. Cortelyou, Philip T. Dodge, S. C. Dunham, Elbert H. Gary, chairman of the Finance Committee of the United States Steel Corporation; John Hayes Hammond, A. Barton Hepburn, Seth Low, Charles Nagel and James Speyer. On the national committee 38 representatives of various industries and other interests will serve.

American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers, held on February 21, a paper by B. F. Cresson, Jr., M. Am. Soc. C. E., entitled The Problem of the Lower West Side Manhattan Water-Front of the Port of New York, was presented for discussion and illustrated with lantern slides. This paper was printed in the *Proceedings* for January, 1912.

American Association of Freight Agents.

The next annual meeting of the American Association of Freight Agents will be held on June 18 in Detroit, Mich., instead of in Chicago as was at first planned. This change has been made because the Republican National Convention will be held in Chicago on that date.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.; annual, May 7-10, Richmond, Va.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.; annual, May 10-11, San Francisco, Cal.

American Association of General Passenger and Ticket Agents.—W. C. Hope, New York; next convention, Seattle, Wash.

American Association of Freight Agents.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Chicago.

American Association of Railroad Superintendents.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.

American Electric Railway Association.—H. C. Donecker, 29 W. 39th St., New York.

American Electric Railway Manufacturers' Assoc.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

American Railway Engineering Association.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

American Railway Master Mechanics' Assoc.—J. W. Taylor, Old Colony building, Chicago. Convention, June 17-19, Atlantic City, N. J.

American Railway Tool Foremen's Association.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.

Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

Association of Railway Claim Agents.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

Association of Transportation and Car Accounting Officers.—G. P. Conrad, 75 Church St., New York.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

General Superintendents' Association of Chicago.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

International Railway Congress.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

International Railway Fuel Association.—D. B. Sebastian, La Salle St. Station, Chicago. Convention, May 22-25, Chicago.

International Railway General Foremen's Association.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

Master Car Builders' Association.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

Master Car and Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass. Convention, 2d week in September.

National Railway Appliances Assoc.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

Northern Railroad Club.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

Omaha Railway Club.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 2 Rector St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.

Railway Industrial Association.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Next meeting, March 18, Chicago.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio. Convention, May 20-22, Buffalo, N. Y.

Railway Supply Manufacturers' Assoc.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

Railway Tel. & Tel. Appliance Assoc.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

Richmond Railroad Club.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. Y., Sterling; September, 1912, Buffalo, N. Y.

St. Louis Railway Club.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

Signal Appliance Association.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

Society of Railway Financial Officers.—C. Nyquist, La Salle St. Station, Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

Toledo Transportation Club.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

Traffic Club of Chicago.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

Traffic Club of New York.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

Train Despatchers' Association of America.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The latest agricultural pamphlet of the Pennsylvania Railroad consists of a reprint of bulletin No. 112, of the Pennsylvania State College, on beef production in Pennsylvania.

The "alfalfa special" is the latest agricultural enterprise of the Erie. A special train carrying professors from the agricultural department of Purdue University, who will lecture on the best methods of growing alfalfa, will be run over the lines of the Erie in Indiana on March 27, 28 and 29.

The Illinois Central has made a contract with the Central Fruit Despatch whereby the latter will exercise general supervision over and handle the perishable freight service of the company, including refrigeration, ventilation, heating, reconsignments, tracing, and the operation of scheduled refrigerator cars.

The senate committee on interstate commerce gave hearings at Washington last week on a proposed law to make carriers unconditionally liable on bills of lading. Arguments were presented by the bankers and by cotton dealers; by F. B. James of Cincinnati, Professor Williston of Harvard University, and others.

The Louisville & Nashville and the Seaboard Air Line, which jointly run a through train nightly each way between Pensacola, Fla., and Jacksonville, 369 miles, have announced that they will comply with the order of the Florida State Railway Commission directing them to discontinue hauling freight cars on these trains. The schedule speed of the trains, according to the present time-tables, is about 20 miles an hour.

In the Federal Court at Chicago on Tuesday of this week the grand jury returned a number of indictments charging violation of the law in giving rebates on passenger fares by paying excessive rates for advertising in theatrical publications. The parties indicted are the Cleveland, Cincinnati, Chicago & St. Louis Railway and H. J. Rhein, general passenger agent; the Michigan Central Railroad and W. H. Underwood, assistant general passenger agent; the Lake Shore & Michigan Southern Railway, and several theatrical companies and their officers.

In connection with the disintegration of the Standard Oil Company of New Jersey, announcement was made in behalf of the company that thereafter all of the former subsidiaries would have to stand on their own feet. In this line it is said now that the Union Tank Line Company has entered into new contracts with the former subsidiary companies, as well as with independent concerns, for the use of its cars in the transportation of oil. The terms of these new contracts are much more favorable to the Union company than formerly. When the money was going into a common treasury the precise proportion of earnings going to any one company was immaterial.

Traffic Club of New York.

The regular meeting of the Traffic Club of New York will be held on February 28. The entertainment committee has secured "Buffalo Jones," in his motion picture lecture, Lassoing Wild Animals in Africa.

Indiana Commission Report.

The Indiana commission in its annual report recounts the following things accomplished by the department during the year, which the commissioners believe to be their most notable achievements:

Denial of the right of steam roads arbitrarily to increase freight rates; ordering of a reduction in express rates; supervision of movement of coal during extreme cold weather; ordering in of numerous block and interlocking signals; use of the commission's power to advance shipments of food, fuel, grain, etc., in times when extraordinary demands existed; requiring the construction of better station facilities (including twenty-five new passenger stations); adjustment of shippers' claims; prevention of unjust rate discrimination; proper disposition of 4,080 cases involving improper physical condition of railway property; causing the removal of scores of unsatisfactory safety appliances; enforcement of orders for greater safety and comfort to passengers on trains and in waiting rooms.

At the close of the year the commission had seventy-nine suits pending in the courts, nine of which were in the federal courts.

The commission reports that the interurban roads have prepared to supply trailers for rush hours as rapidly as possible, but it is not likely that the additional cars can be provided for some time yet. There are many other things which should be demanded of the interurban companies before the commission would be warranted in ordering additional cars and crews. The crowding is merely a matter of inconvenience, while the other matters that require attention are such as involve the safety, health, etc., of the passengers.

Block signals, precautions for protection in cases of high speed, more nearly perfect systems of despatching and increasing efficiency in train crews are things the commission believes should receive attention at the hands of the interurban owners before the demands of the public for more cars during the rush hours are granted. The interurban companies are not making enough money to warrant the commission's ordering all improvements which the public would like to have put in. The development of the interurban properties has been very rapid and the commission holds that the companies must have time to meet naturally the requirements of their increasing traffic.

During last year some of the important interurban lines have installed automatic block systems and others are preparing for their installation. All the companies have complied with the commission's order concerning experienced motormen, and there are now very few, if any, motormen on interurban cars in the state who have not had at least one year's experience. A further safeguard has been provided at the order of the commission by installing separate compartments for motormen.

The total capitalization of all the electric roads in the state, as shown by the report, is $17,895,000 for a total of 2,601 miles.

Our Obsolete Sherman Law.

Imagine two armies marching in parallel columns; not hostile armies, but supporting armies, and you will have a picture of the life of a people as it ought to move forward, and the law of the land as it ought to move forward also. But often in the history of men it has been the column of the law of the land that has fallen behind. When more than two centuries ago our ancestors ripened into capacity for full personal freedom, it was the law of the land that had to be brought up by the Bill of Rights. When more than a century ago our ancestors ripened into capacity for full self-government, it was the law of the land that had to be brought up by our constitution. When in 1896, turning from the field of personal freedom to economic conditions, we ripened into a commercial world power, it was the law of the land that had again to be brought up in the adoption of the world's monetary standard. And here we are again in the midst of another period when the law of the land is again behind, in both its human and its economic aspects, the moving column of the nation's life. . . .

Laws so illegible (as the Sherman law) should be no part of the jurisprudence of a free country. And on this account it is easy enough before an audience, made up of business men, to say—repeal the Sherman act. But would that bring up, abreast the moving column of our national life, the belated column of the law as a whole? Would it not be merely stopping the column altogether?—*Judge Grosscup before the New York Traffic Club.*

INTERSTATE COMMERCE COMMISSION.

The commission has suspended until June 12 proposed increased rates on coal on the Chicago, Burlington & Quincy from Crosby, Wyo., to Butte, Mont.

W. P. Borland, for the last five years secretary of the Block Signal and Train Control Board, has been transferred to the division of safety appliances, where he will be assistant chief inspector of safety appliances. Mr. Borland was an employee of the commission for several years before the establishment of the Block Signal Board. He was formerly a locomotive runner, and has had experience in numerous other positions in the operating department.

The Interstate Commerce Commission has notified shippers and others interested that briefs setting forth their objections to provisions of Western Classification No. 51 must be filed by April 10. Oral arguments will begin at Washington on April 15. Several petitions have been sent to the commission asking that some of the hearings be held in Chicago. Representatives of the state railway commissioners, whose protests led to the suspension of the classification, held a meeting at St. Louis on Tuesday, to check the classification and prepare their case for the hearings.

Poles Given the Lumber Rate.

National Pole v. Chicago, St. Paul, Minneapolis & Omaha et al. Opinion by the commission.

Following the case of MacGillis & Gibbs v. C. & E. I., 16 I. C. C., 40, the rate on cedar poles from Wisconsin and Michigan points to Texas is found unreasonable, insofar as it exceeds the rate on lumber between the same places. (22 I. C. C., 378.)

Milk Rates in New England.

George Albree v. Boston & Maine. Opinion by Commissioner Prouty:

In this case the plaintiff asked that the leased-car system be abolished, and the attorney general of Massachusetts intervened, making the same demand in behalf of the state. The decision holds that the leased-car system is not unlawful, if the tariffs are properly framed; that there should be a rate by the can, bearing a proper relation to the carload rate; and that icing facilities should be provided when shipments at the per-can rate are offered from a given section equaling 600 cans a day (cans holding 8½ quarts). No order is issued, but the case is held open pending possible further complications in the application of the principles laid down. (22 I. C. C. 303.)

Sacramento Gateway Remains Closed.

H. S. Gile & Co. et al. v. Southern Pacific et al. Opinion by Commissioner Lane.

This is an application that the Sacramento gateway be reopened on traffic moving from the eastern states to the cities of Oregon. Two routes, which were formerly under separate managements, have now been merged and the traffic for which there was formerly competition is now forced by the rate adjustment to move over the more direct line. So long as the public secure reasonable rates and prompt service by the direct line, there is no substantial reason why the traffic should not follow the line of least resistance. There lies behind this complaint, however, the belief that there are benefits to be had from competition between genuinely rival carriers which cannot be gained when such competition ceases, even under government regulation. The petition is brought in the mistaken belief that the commission has power to order railways to compete with each other. The petition for opening the Sacramento gateway is refused, but the question of reparation on transcontinental shipments to Willamette valley points will be reserved for a later case now on the commission's docket. (22 I. C. C., 298.)

Demurrage on Embargoed Cars.

Brooklyn Cooperage Co. v. Illinois Central. Opinion by the commission.

In this case demurrage charges were made on cars being held for delivery to the Illinois Central, the Illinois Central having at various times issued temporary embargoes, and the demurrage was collected by the lines holding the cars for delivery to the I. C. There was no negligence or fault shown on the part of the I. C., the embargoes being necessitated by unusually heavy business. The demurrage charges are therefore found to be reasonable. (22 I. C. C., 358.)

Commission Refuses to Enforce Contract.

Ralston Townsite Co. et al. v. Missouri Pacific. Opinion by the commission.

The complainant says that it has a contract with the railway which provides for the building of a sidetrack and the connection of this sidetrack with the line of the M. P. The commission is without jurisdiction to compel a railway to specifically perform a contract or to award damages for breach of contract. The power of the commission to order a track connection with a private sidetrack is limited to cases in which the sidetrack is already built and in which it is physically practicable to make such connection. In this case the sidetrack has not been built, and the commission has no power to order such a track built by the railway company. The complaint is therefore dismissed. (22 I. C. C., 354.)

Advance in Minimum L. C. L. Rate Refused.

In re suspension of advances in rates on single packages and small lots. Opinion by Commissioner Clark.

The railways advanced the minimum rate on L. C. L. shipments in official classification territory from 25 cents to 35 cents. An attempt was made to get at the station cost of handling average minimum shipments. Certain roads estimated the cost of handling such shipments from large to small stations as follows: Pennsylvania Railroad, 23.70 cents; New York Central, 17.46; Cleveland, Cincinnati, Chicago & St. Louis, 15.49; Boston & Albany, 15.70; Baltimore & Ohio, 16.04. Very wide differences were found in the estimates of the costs at different stations on the same road, and as between different roads. The cost figures are not sufficiently reliable, the commission finds, to represent the real conditions, and they do not sustain the burden of proof which the statute puts on the railway. The carriers are expected, therefore, to cancel their advances.

Rate on Hardwood Lumber Reduced.

McLean Lumber Co. v. Louisville & Nashville et al. Opinion by the commission.

The complainant shipped hardwood lumber to Philadelphia, specifying on the bill of lading both the route and the rate. There was no such rate applying by the route specified, and the delivering railway charged the rate applying under existing tariffs on the specified route. The commission holds that there is nothing wrong in such a charge, since specific routing instructions were given. On the other hand, the rate on hardwood lumber via the L. & N. is too high, and, even making the modifications suggested by the L. & N., it is still higher by eight cents per 100 lbs. than the rate on yellow pine lumber. This the commission finds to be unreasonable and orders the rate on hardwood lumber reduced to not more than two cents per 100 lbs. higher than the yellow pine rate. Reparation is awarded on the basis of the rates now established. (22 I. C. C., 349.)

Reparation Awarded.

Humboldt Refining Co. v. Missouri, Kansas & Texas et al. Opinion by the commission.

A rate of 36 cents per 100 lbs. on crude petroleum in tank cars from Sapulpa, Okla., to Humboldt, Kan., found unreasonable. (22 I. C. C., 363.)

Swift & Co. v. Missouri Pacific et. al. Opinion by the commission.

The Missouri Pacific absorbed switching charges on L. C. L. freight destined to Missouri Pacific freight houses when it received the freight from connecting roads within the switching limits of Kansas City, Mo., but did not absorb switching charges on freight moved through its train yards. The handling of freight through the train yards was apparently done only for the convenience of the Missouri Pacific. The commission, therefore, finds that the practice of not absorbing switching charges on cars handled through the train yards results in an unfair discrimination. (22 I. C. C., 385.)

STATE COMMISSIONS.

The Minnesota railway commission has ordered officers of all the steam railways operating in the state to appear before it March 5 for consideration of a schedule of freight rates on logs. In 1907 the commission established certain rates on logs which were operative for only two years. Since the expiration of the order some of the railways have increased the rates.

The Michigan railway commission has prohibited the railways of the State from exceeding certain prescribed rates of speed during the winter at several points which the commission considers

dangerous. The order also prohibits making up lost time. It is said to have been suggested by a report to the commission that on one night last week 250 broken rails were found in the tracks of the Michigan Central between Detroit and Chicago and 174 on the Pere Marquette between Detroit and Grand Rapids.

The Mississippi railway commission has rescinded the action of its predecessors in adopting the Southern classification for intrastate business, and has substituted the old Mississippi state classification which was formulated in 1895. The action was taken in response to protests from certain shippers against some advances in the new Southern classification. Railway officials contended that the old state classification is obsolete and that the Southern classification, which is in effect in neighboring states, lists 2,000 articles not included in the state classification, that 60 per cent. of the ratings are the same in both, and that of the changes made in the recent reissue of the Southern classication 21 per cent. were in the nature of reductions, and 19 per cent. in the nature of advances.

The New York Public Service Commission, Second district, has given the Lehigh Valley permission to charge less for a long haul for passengers than for a shorter haul, in a case where the railway company has no station facilities at a junction on its main line where the branch line to Spencer and Van Etten leaves it. Passengers are therefore carried on to the next station and beyond Lockwood to a station where they change, taking a train going back through the junction to Spencer, etc. The one-way tickets, therefore, are lower to Van Etten and Spencer than from the same points to Lockwood, although the Spencer passengers are actually carried through Lockwood. The commission holds that in such a case the railway may properly be relieved from the long and short haul provision of the New York law.

COURT NEWS.

The commerce court has denied the application of the railways for a temporary injunction restraining the Interstate Commerce Commission from enforcing the rate of $1 per 100 lbs. on lemons from California to eastern cities as recently fixed by the commission.

The United States Commerce Court, in the complaint of the Kansas City Southern against the Interstate Commerce Commission's classification of expenditures for additions and betterments, has overruled the motion to dismiss and the case is to be tried on its merits.

The United States Court of Appeals at San Francisco has sustained the demurrers of the state railway commission and dismissed the Southern Pacific's bill of complaint in the San Pedro rate case, in which the railways sought to prevent the commission from enforcing its order reducing rates between Los Angeles and the port of San Pedro. It is estimated that the reductions which now become effective will reduce the revenues of the Southern Pacific by $112,000, and of the Santa Fe and the San Pedro, Los Angeles & Salt Lake together by $200,000 annually.

The Supreme Court of the United States this week, for the second time, has sustained the "Carmack amendment" to the Interstate Commerce law passed by Congress in 1906, and making carriers on whose road shipments originate liable for loss or damage incurred at any point on the route to a destination beyond its own line. The present decision concerned a shipment of mohair from Uvalde, Tex., to Lowell, Mass., over the Galveston, Harrisburg & San Antonio. The Texas State courts not only upheld the law, but declared that state courts as well as federal courts would enforce it.

The Supreme Court of the United States in the case of the United States Express Company against the state of Minnesota, has sustained the tax law of the state. The statute imposed a tax on gross receipts. The express companies resisted the tax in so far as it was based on shipments originating in the state and destined to a point in the state, passing out of the state and returning to the state again in transit. The companies contended that this was interstate commerce; but the court held that it was not. Another point made by the express company was that inasmuch as part of its gross receipts was from interstate commerce, it could not be taxed by the state. This claim was also denied by the court.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. W. Newlean, general auditor of the Illinois Central at Chicago, has been appointed comptroller, with office at Chicago.

L. J. Hensley has been appointed assistant auditor of the Kansas City Southern, with office at Kansas City, Mo., succeeding F. W. Meyer, resigned.

W. J. Bienemann, secretary and auditor of the Kanawha & Michigan, with office at Charleston, W. Va., has resigned to go to a New York corporation.

E. E. Honn, general auditor of Wells, Fargo & Company, with office at Chicago, has been transferred at his own request to the operating department, and his former position has been abolished.

J. H. Doughty, general agent in the freight department of the Chicago & Eastern Illinois at Chicago, has been appointed general agent in the executive department of all St. Louis & San Francisco lines, with office at Birmingham, Ala, succeeding A. D. Lightner, promoted.

A. D. Lightner, whose recent appointment as general agent in the executive department of the St. Louis & San Francisco lines at New Orleans, La., has been announced in these columns, has been elected also president of the New Orleans Terminal Company, succeeding D. D. Curran.

J. I. Morrison, auditor of the Lehigh Valley at Philadelphia, Pa., has been appointed general auditor, succeeding G. N. Wilson, resigned to engage in other business, and the title of auditor has been abolished. E. C. Mann has been appointed auditor of disbursements, with office at Philadelphia, Pa.

Stuart H. McIntosh, whose appointment as general auditor of the Boston & Maine, with office at Boston, Mass., has been announced in these columns, was born in 1872 at London, Eng., and was educated at King's College, London. In 1889 he entered the service of the Northern (N. H.) Railroad, which was subsequently leased to the Boston & Maine, and he has remained in the continuous service of the Boston & Maine since that time. Mr. McIntosh was appointed assistant general auditor in 1902, which position he held at the time of his recent appointment as general auditor.

Operating Officers.

B. Casey has been appointed assistant superintendent of the St. Louis & San Francisco, with office at Enid, Okla.

A. Hatton has been appointed acting superintendent of car service of the Canadian Pacific, with office at Winnipeg, Man., succeeding D. C. Coleman, promoted.

George Hodge, superintendent of the Canadian Pacific at London, Ont., has been appointed general superintendent of the Eastern division, with office at Montreal, Que., succeeding F. P. Gutelius, resigned.

A. Mortiz, trainmaster of the Atlanta & West Point at Montgomery, Ala., has been appointed superintendent of the Brunswick division of the Atlanta, Birmingham & Atlantic, and the Fitzgerald, Ocilla & Broxton, with office at Fitzgerald, Ga., succeeding G. C. Smith, resigned.

J. V. Clifford, chief train despatcher of the Gulf, Colorado & Santa Fe at Cleburne, Tex., has been appointed trainmaster, with office at Cleburne, succeeding E. C. Lilley, resigned to accept service with another company. E. B. Fry, night train despatcher, succeeds Mr. Clifford.

R. A. Crofton has been appointed assistant general manager in charge of motive power of the Galveston, Harrisburg & San Antonio, the Houston, East & West Texas, the Houston & Shreveport, the Houston & Texas Central and Texas & New Orleans, with office at Houston, Tex., succeeding J. T. Connor, granted indefinite leave of absence.

Traffic Officers.

H. B. Johnston has been appointed traveling passenger agent of the Canadian Pacific, with headquarters at Portland, Ore.

W. M. Biggerstaff has been appointed acting agent of the Erie Despatch, with office at St. Joseph, Mo., succeeding E. R. Lauer, promoted.

J. A. McDonald has been appointed district passenger agent of the Canadian Pacific, with office at Nelson, B. C., succeeding W. J. Wells, resigned.

H. C. Hallmark and E. J. Fenchurch have been appointed assistant general freight and passenger agents of the Arizona Eastern, with office at Tucson, Ariz.

H. A. Slagle has been appointed district passenger agent of the Missouri, Kansas & Texas, with office at Detroit, Mich., succeeding W. P. Overbay, transferred.

E. A. Wilson has been appointed general freight and passenger agent of the Port Bolivar Iron Ore Railway, a line from Longview, Tex., to Ore City, which was recently opened to traffic.

W. H. Bennett, commercial agent of the Southern Railway at Knoxville, Tenn., has been appointed district freight agent at Chattanooga, succeeding E. C. Morgan, transferred. J. W. Bray succeeds Mr. Bennett.

W. O. Monroe, chief clerk in the passenger department of the International & Great Northern, at Houston, Tex., has been appointed assistant general passenger and ticket agent, with office at Houston, succeeding W. C. Knowles, resigned.

J. B. Stewart, general eastern agent of the New York, Ontario & Western, at New York, has been appointed general freight and passenger agent, with office at New York, succeeding J. R. Dunbar, deceased. C. B. McManus, Jr., contracting agent at New York, succeeds Mr. Stewart.

George H. Kummer, division freight agent of the Chicago & Eastern Illinois at Salem, Ill., has been appointed general agent in the freight department, with office at Chicago, succeeding J. H. Doughty, promoted. (See item under Executive, Financial and Legal Officers.) L. G. Lucia, division freight agent at Danville, Ill., succeeds Mr. Kummer, and M. V. Bowman, agent at Tuscola, Ill., succeeds Mr. Lucia.

Engineering and Rolling Stock Officers.

J. T. Carroll, whose appointment as assistant general superintendent of motive power of the Baltimore & Ohio, with office at Baltimore, Md., has been announced in these columns, was born on June 12, 1875, at Cassadaga, N. Y., and graduated from Purdue University, Lafayette, Ind. Mr. Carroll entered the service of the Brooks Locomotive Works as draftsman in September, 1891, remaining with that company until January 1, 1896, and was then consecutively draftsman on the Erie, the Chicago, Rock Island & Pacific, and the Chicago & North Western. In August, 1899, he was appointed mechanical engineer of the New York, Chicago & St. Louis, and until May, 1910, was in the service of the New York Central Lines West of Buffalo, N. Y. He was then appointed superintendent of motive power of the Baltimore & Ohio, with office at Pittsburgh, Pa., which position he held at the time of his recent appointment as assistant general superintendent of motive power.

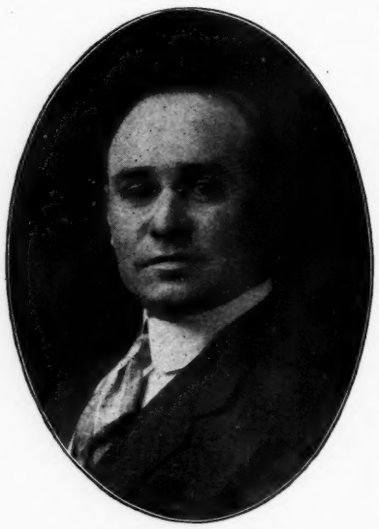
J. T. Carroll.

O. A. McCombs has been appointed roadmaster of the Texas & Pacific, with headquarters at Dallas, Tex.

E. F. McCrea has been appointed division engineer of the Central system of the Pennsylvania Lines West, with office at Toledo, Ohio, succeeding Guy Scott, transferred.

P. H. McFadden, division roadmaster of the Great Northern at Everett, Wash., has been appointed assistant engineer maintenance of way of the Western district and the Butte and Montana divisions of the Central district, with headquarters at Seattle, Wash., and the jurisdiction of John Sesser, assistant engineer maintenance of way at St. Paul, Minn., is limited to the Lake and Eastern districts and the Minot division of the Central district.

Edward S. FitzSimmons, whose appointment as mechanical superintendent of the Erie Railroad, with office at Cleveland, Ohio, has been announced in these columns, was born in April, 1876, at Columbus, Ohio, and was educated at the high school and the night business school at Horton, Kan. He also took a mechanical engineering course through a correspondence school, and began railway work on August 6, 1890, with the Chicago, Rock Island & Pacific at Horton. He remained with that company until May, 1899, and then went to the Delaware, Lackawanna & Western as foreman boiler maker at Scranton, Pa. In February, 1904, he was sent by the same company to the Baldwin Locomotive Works as inspector of new equipment. Mr. FitzSimmons went to the New York, New Haven & Hartford in August, 1904, as general boiler inspector, with headquarters at New Haven, Conn., and in February of the following year he was appointed general foreman boiler maker of the Erie, with office at Meadville, Pa. He was promoted to master mechanic of the Cincinnati division in August, 1907, with office at Galion, Ohio, and the following February was transferred in the same capacity to the Allegheny and Bradford divisions, with office at Hornell, N. Y., which position he held at the time of his recent appointment as mechanical superintendent of the same road.



E. S. FitzSimmons.

Special Officers.

Ernest A. Sterling, forester of the Pennsylvania Railroad at Philadelphia, Pa., has resigned to open an office as consulting forester and timber engineer at 1331-32 Real Estate Trust building, Philadelphia. Mr. Sterling was elected president of the American Wood Preservers' Association at the annual meeting held in Chicago last month.

OBITUARY.

Clarence Wells, secretary of the Mexico North Western, with office at New York, died at his home at Mt. Vernon, N. Y., of pneumonia on February 1. Mr. Wells was 51 years old. The greater part of his railway life was spent under A. A. Robinson. He started work in 1876 as stenographer to Mr. Robinson when the latter was chief engineer of the Santa Fe, and was later his chief clerk. After 16 years he left railway work, but a few years later became traveling secretary and then secretary of the Mexican Central, of which Mr. Robinson was then president. Mr. Wells later became secretary to the president of the Rio Grande, Sierra Madre & Pacific and subsidiary companies, and he was also secretary of several of the subsidiaries. When the Mexico North Western was organized he was made secretary, which position he held at the time of his death. Mr. Wells was a brother of A. G. Wells, general manager of the Santa Fe Coast Lines, also R. E. Wells, general manager of the San Pedro, Los Angeles & Salt Lake, and of R. R. Wells, connected with the engineering department of the Santa Fe.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE PENNSYLVANIA RAILROAD will build 42 locomotives at its Altoona shops.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 40 mikado locomotives from the Baldwin Locomotive Works, and 10 mikado locomotives from the American Locomotive Company.

O'BRIEN, MCDOUGALL & O'GORMAN, Ottawa, Ont., have ordered seven 10-wheel locomotives from the Montreal Locomotive Works. The dimensions of the cylinders will be 18 in. x 24 in., the diameter of the driving wheels will be 50 in., and the total weight in working order will be 109,000 lbs.

THE CHESAPEAKE & OHIO has ordered 25 Mallet locomotives and 24 mikado locomotives from the American Locomotive Company. The Mallet locomotives are duplicates of those previously ordered from the American company, with the exception that in working order they will weigh 20,000 lbs. more. The mikado locomotives are duplicates of those described in the *Railway Age Gazette* of February 2.

THE OAHU RAILWAY & LAND COMPANY, Honolulu, Hawaii, has ordered 1 consolidation locomotive and 1 six-wheel switching locomotive from the American Locomotive Company. The consolidation locomotive will have 16 in. x 20 in. cylinders, 38 in. driving wheels, and in working order will weigh 94,000 lbs. The switching locomotive will have 14 in. x 20 in. cylinders, 38-in. driving wheels, and in working order will weigh 64,000 lbs.

CAR BUILDING.

THE TWIN MOUNTAIN & POTOMAC has ordered 18 box cars from the American Car & Foundry Company.

THE GREAT NORTHERN is said to be asking prices on 100 forty-ton ballast cars. This item has not been confirmed.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is said to be in the market for 150 box cars. This item has not been confirmed.

THE CUDAHY PACKING COMPANY, Chicago, has not ordered 350 refrigerator cars, as reported in the *Railway Age Gazette* of February 9.

THE LOUISIANA RAILWAY & NAVIGATION COMPANY is said to have ordered 200 coal cars and one chair car. This item has not been confirmed.

THE DULUTH, SOUTH SHORE & ATLANTIC has ordered two observation-cafe cars and two dining cars from the Barney & Smith Car Company.

THE BETHLEHEM STEEL COMPANY, South Bethlehem, Pa., is said to be in the market for 100 sixty-ton all-steel coal cars. This item has not been confirmed.

THE GRAND RAPIDS & INDIANA is said to be in the market for 300 fifty-ton gondolas and 50 thirty-ton steel-underframe automobile cars. This item has not been confirmed.

THE PENNSYLVANIA LINES WEST have ordered 54 all-steel passenger cars. This order comprises 29 coaches, 2 baggage cars, 8 combination baggage and mail cars, 4 passenger and baggage cars and 11 dining cars.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 20 sixty-foot all-steel combination baggage and mail cars, and 10 sixty-foot all-steel combination passenger and baggage cars from the Pullman Company and 10 sixty-foot all-steel baggage cars from the American Car & Foundry Company.

IRON AND STEEL.

THE NORFOLK & WESTERN has ordered 12,000 tons of rails from the Carnegie Steel Company.

THE KANSAS CITY TERMINAL has ordered 2,000 tons of rails from the Illinois Steel Company.

THE TENNESSEE CENTRAL has ordered 2,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

Supply Trade News.

The Jones Car Door Company, Chicago, has been incorporated in Maine, with $50,000 authorized capital stock. Charles L. Andrews of Augusta is clerk of the corporation.

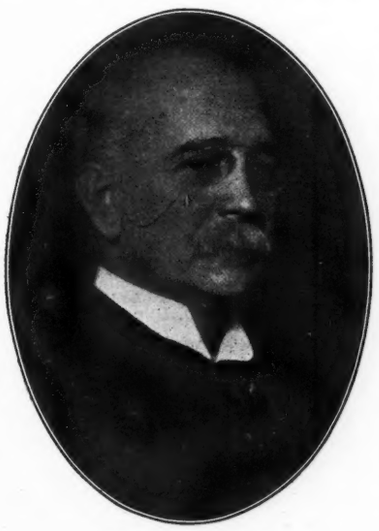
O. W. Youngquist, who for a number of years has been with the H. Channon Company as railway sales manager, has been made manager of the Chicago office of Hubbard & Company, Pittsburgh, Pa.

The Smith Locomotive Adjustable Hub Plate Company of Pittsburg, Kan., is equipping two engines for the Missouri, Kansas & Texas at the company's shops at Parsons, Kan., with the Smith hub plate.

William B. Hall, superintendent of equipment of the Mather Horse & Stock Car Company, Chicago, has been made vice-president and general manager of the Illinois Car & Manufacturing Company and the Illinois Bolt Nut & Forging Company, both of Chicago, with office in the Great Northern building, Chicago.

The Bucyrus Company, South Milwaukee, Wis., announces the opening of an office at Duluth, Minn., under the management of E. C. Hingston, who will have general charge of the sale of steam shovels, dredges, drag line excavators and the company's other products in the vicinity of Duluth and the iron ranges. Mr. Carl Horix has been appointed central sales manager of the company and will be in charge of the new Chicago office, 622 McCormick building, the old office in the Monadnock block being discontinued. Mr. Horix will have general charge of the sale of steam shovels, dredges, general excavating machinery, railway cranes and pile drivers, in the central states.

Francis H. Stillman, president of The Watson-Stillman Company, New York, died suddenly on February 18 of intestinal hemorrhage at his home in Brooklyn, N. Y. Mr. Stillman was born in New York on February 20, 1850, and was graduated from the Sheffield Scientific School, Yale University, in the class of 1874. In 1883 he organized and became president of the firm of Watson & Stillman. The firm was incorporated in 1904 as The Watson-Stillman Company, Mr. Stillman remaining its president up to the time of his death. Mr. Stillman was a member of the Hanover Club of Brooklyn, the Engineers' Club, the American Society of Mechanical Engineers, and treasurer and, continuously throughout its existence, a director of the National Association of Manufacturers. He organized and was first president of the Machinery Club of New York, and was also first president of the National Metal Trades' Association. In addition to being president of The Watson-Stillman Company at the time of his death, he was also president of the Bridgeport Motor Company, Bridgeport, Conn., and of the Pequannock Commercial Company, and a director in other manufacturing firms.



Francis H. Stillman.

George A. Post, Jr., has been made western sales manager of the Standard Coupler Company, New York, with office in Chicago, succeeding Charles D. Jenks, resigned to engage in another business. Mr. Post graduated from Cornell University with the degree of M. E. in 1905. He began work in the Westinghouse Machine Company's works in Wilmerding, Pa., and then was in its New York sales office for a year and a half, after which he entered the employ of the Standard Coupler Company in its sales department. Upon the organization of the Railway Business Association he was appointed assistant to the president, which posi-

tion he held for two years, and has had personal charge of the business details of the dinners of that association. A year ago he returned to the service of the Standard Coupler Company as eastern sales manager.

TRADE PUBLICATIONS.

Fans.—The Sprague Electric Works, New York, of the General Electric Company, has published catalog No. 325 on ceiling, wall and desk fans, illustrating the various types and giving specifications, dimensions and prices.

Chicago, Burlington & Quincy.—The passenger department of this company has published an illustrated folder called California Excursions Personally Conducted, telling of many of the most picturesque trips that may be made in California, and illustrating some of the choice bits of scenery. The folder includes a large map and furnishes information on the trains and their equipment.

Tube Corrosion.—The National Tube Company, Pittsburgh, Pa., has published in bulletin No. 4 an article entitled Corrosion of Boiler Tubes, by Rear Admiral John D. Ford, U. S. N. This is an abstract of an article from the Journal of the American Society of Naval Engineers of May, 1904. The results of a number of tests are described and illustrations are included of tubes after they have been submitted to various tests.

Friction Clutches.—The Carlyle Johnson Machine Company, Manchester, Conn., has published a booklet entitled The Johnson Friction Clutch as Applied in Machine Building, in which the fac-similes of a number of letters from different machine companies are given, telling of the success with which these clutches have met. The booklet also includes illustrations of machine tools of various makes which have been equipped with these clutches.

Pennsylvania Railroad.—The freight department of this company has published a 25-page illustrated booklett on Beef Production in Pennsylvania, which is the reprint of an article by W. A. Cochel, which appeared in Bulletin No. 112 of the Pennsylvania State College Agricultural Experiment Station. This booklet gives many interesting and useful facts on breeding and feeding steers, and shows that they return large profits over a period of years, as well as build up the fertility of the soil, so that greater crops may be produced.

FOREIGN RAILWAY NOTES.

The public works committee of New South Wales has recommended the construction of the proposed line from Barellan towards Mirool, a distance of 32 miles. The estimated cost of the line is $480,000, or at the rate of $15,000 per mile. It is anticipated that there will be a loss of $12,020 a year in the operation of the line at first, but that when the irrigation area is populated a large volume of traffic will be developed and the present estimated revenue many times exceeded.

It is expected that preliminary work in connection with the duplication and regrading of the Caulfield line, Victoria, from South Yarra to Caulfield, will be begun shortly. Plans have been prepared and the department of public works is now making the necessary arrangements for the commencement of actual work. The estimated cost of the duplication work is $935,000, and of regrading the lines so as to abolish all grade crossings between South Yarra and Caulfield, $620,000.

The German railways had a favorable year in 1911. For 11 months there was an increase of about 5 per cent. in passenger earnings, and 9 per cent. in freight earnings. The extraordinary drought which was calamitous to the agricultural interests, actually increased, for the time, the railway traffic, the water being so low in nearly all rivers that their traffic was turned to the railways; though the latter suffered a notable decrease in earnings by a general reduction of rates after September, in rates on forage and especially potatoes, amounting to about 50 per cent., partly made up in gross, probably, by an increase in long hauls. Industries have been thriving; the production of iron was the largest ever known, and the coal shipments much larger than in 1910.

Railway Construction.

New Incorporations, Surveys, Etc.

Bassano (Electric).—Incorporated in Canada with $250,000 capital to build a 40-mile line in the province of Alberta. S. E. Whitney, C. Harris, Z. C. Ingram, F. Murcheson and W. Robinson are interested.

California Air Line.—Incorporated in California, with $20,000,000 capital, to build a line to Los Angeles. The incorporators are C. E. Craig, G. Behymer and V. L. Gelffrion, Los Angeles, and R. S. Twomby, Pasadena.

Canadian Northern.—According to press reports, a contract has been given recently to J. P. Mullarkey to build a 90-mile section between Ottawa, Ont., and Pembroke. This contractor already has contracts for two other sections on the Toronto-Ottawa line. T. Turnbull, assistant chief engineer, Winnipeg, Man.

Crows Nest Pass (Electric).—This company, with a capital of $500,000, has applied for a charter in Canada to build from Cowley, Alta., west via Lundbrek, Burmis, Passburg, Bellevue, Frank, Blairmore and Coleman, to a point near Crows Nest lake. The incorporators include W. A. Beede, R. Coulthard and T. B. George, all of Blairmore, Alta.

Greenville & Whitewright Northern Traction.—Incorporated in Texas with $210,000 capital, to build a line to connect Greenville, Tex., Merit, Blueridge, Westminster and Whitewright, about 25 miles. The directors include A. R. Nicholson, H. A. Barsun, J. E. Morris and W. H. James, Greenville, and S. M. Dickins, Merit.

Gulf, Texas & Western.—According to press reports this company will build a 25-mile extension from Jacksboro, Tex., southeast to a connection with the Weatherford, Mineral Wells & Northwestern at Salesville, or at Oran. J. J. Jermyn, president, Scranton, Pa.

Hudson Bay Railway.—The Dominion government will build from LePas, Northwest territory, Canada, northeast to Port Nelson, or Fort Churchill on Hudson Bay, about 400 miles. It has not yet been decided which of these two places will be the northern terminus. A contract was given to J. D. McArthur, Winnipeg, for work on the first 185 miles, and work was started on this section last fall. No track has yet been laid. The work is light, being principally through muskeg, and involves handling an average of about 18,000 cu. yds. a mile. The maximum grade will be .4 per cent., and maximum curvature 3 deg. The line is being built to carry wheat to tidewater at Hudson Bay, and the traffic from Hudson Bay will consist of general merchandise. The minister of railways and canals will have charge of the work. John Armstrong is chief engineer, with principal office at Winnipeg, Man. (February 2, p. 221.)

Iowa Short Line.—Incorporated in Delaware, with $5,000,000 capital, and main office at Philadelphia, Pa., to build a railway in Iowa. T. G. Hunter, vice-president; Andrew Luffberry, secretary. J. G. Hess, Council Bluffs, Iowa, is interested.

Mahar (Electric).—Incorporated in Canada with $250,000 capital to build electric railways in the province of Alberta. The incorporators include C. E. Owens, E. M. Adams, G. O'Grady, J. Huse and F. W. Phillips, all of Alberta.

Minneapolis & St. Louis.—According to press reports this company has plans made to build an extension from Minneapolis, Minn., to the Canadian border. It is said that an extension will also be built to Omaha, Neb. R. G. Kenly, chief engineer, Minneapolis, Minn.

National Railways of Mexico.—According to press reports work is to be started soon on a line from Allende, Mex., north to Las Vacas on the Rio Grande, opposite Del Rio, about 80 miles. A connection is to be made with the Kansas City, Mexico & Orient. James M. Reid, chief engineer, Mexico City.

Nebraska Roads.—Incorporation has been asked for by a company with $300,000 capital, to build from Springview, Neb., southwest to Spaulding, about 125 miles. The incorporators in-

clude C. F. Lear, C. A. Ripley, C. E. Coon, J. F. Carr, and J. N. Cassidy, Jr.

NORTHERN PACIFIC.—According to press reports, a contract has been given to Nelson Bennett, Tacoma, Wash., to construct the Point Defiance tunnel. A contract for work on the Point Defiance line, from the south end of the tunnel to Tenino, it is said, has been let to Porter Brothers, and to Grant, Smith & Company, both of Spokane. The work includes the grading, the construction of a sea-wall, and all necessary bridges. W. L. Darling, chief engineer, St. Paul, Minn. (January 12, p. 76.)

OREGON ELECTRIC.—This company has given a contract to Copenhagen Brothers, Salem, Ore., to build a 2-mile section from Albany, Ore. L. B. Wickersham, chief engineer, Portland, Ore.

OREGON SHORT LINE.—An officer writes that this company does not expect to build the Central Idaho through Boise, Idaho, during 1912. The present plans only contemplate building the line to Taft, about 58 miles, from Richfield, on which work is expected to be finished this year. The question of extending the branch further west will be taken up later. W. H. Bancroft, general manager, Salt Lake City, Utah.

ST. LOUIS, BROWNSVILLE & MEXICO.—An officer writes that a contract has been given to P. G. Burns, Houston, Tex., to build from Bloomington to Victoria, 13 miles. The company expects to have all the work finished by May. F. G. Jonah, chief engineer, St. Louis. (January 5, p. 37.)

SAN FRANCISCO & NORTHERN (Electric).—Incorporated in California with $2,500,000 capital, to build from Santa Rosa, Cal., south to San Quentin, 42 miles. The incorporators include A. J. and J. C. Kittle, Ross; A. Forland, Oakland; F. A. Branch, Santa Rosa, and W. L. Jackson.

TEMISKAMING & NORTHERN ONTARIO.—Bids are to be asked for soon, it is said, to build the 30-mile extension to Elk Lake, Ont. S. B. Clement, chief engineer and superintendent maintenance, North Bay, Ont. (December 22, p. 1301.)

RAILWAY STRUCTURES.

CUMBERLAND, MD.—An officer of the Baltimore & Ohio writes that the company expects to start work this spring on new shops at Cumberland, Md. The plans have not yet been completed. The cost of the work will be between $300,000 and $400,000.

DULUTH, MINN.—It is reported that the Great Northern will build a large freight house at Duluth sometime this year.

EAST WACO, TEX.—The Missouri, Kansas & Texas is reported as about to begin work on terminal improvements, including the construction of shops, roundhouse, turntable and a water-softening plant.

LAMBERT'S POINT, VA.—The Norfolk & Western is expected to begin shortly the construction of a large coal pier, together with a new roundhouse, shops and freight houses, in addition to increasing its yard trackage.

LOS ANGELES, CAL.—The Southern Pacific and the San Pedro, Los Angeles & Salt Lake have prepared plans for a joint passenger station. The Atchison, Topeka & Santa Fe will build a separate station of its own.

NEW ORLEANS, LA.—It is reported that the St. Louis & San Francisco is negotiating for 1,600 ft. of wharf space along the river front.

ST. JOHN, N. B.—According to press reports, a contract has been given to Norton, Griffiths & Company, for railway terminal improvements to be carried out at Courtenay Bay, at a cost of about $7,500,000. The work is to be completed within four years. The plans call for the construction of a breakwater, dredging work in the harbor, reclaiming a site for railway terminals, and constructing about 4,890 ft. of wharves.

TOLEDO, OHIO.—The Lake Shore & Michigan Southern has submitted to the mayor and the board of public works of Toledo plans for the extension of its yard at Air Line Junction, representing an outlay of approximately $2,000,000.

Railway Financial News.

CHESAPEAKE & OHIO.—H. E. Huntington, already a director of the C. & O., has been elected a member of the executive committee, succeeding Theodore P. Shonts, who remains a director.

CHICAGO & NORTHWESTERN.—This company has filed applications with the railway commissions of Nebraska and Wisconsin for permission to issue $10,000,000 equipment notes. The securities, however, will not be put out for some months yet. Directors have not yet authorized the issue but will do so when permission is granted to put them out.

DAYTON, LEBANON & CINCINNATI.—See Pennsylvania Company.

LAKE SHORE & MICHIGAN SOUTHERN.—The 60,000,000 francs ($12,000,000) one-year notes falling due in March have been renewed for another year. Of these notes, 25,000,000 francs ($5,000,000) were renewed in Paris and 35,000,000 francs ($7,000,000) were renewed in London.

LEHIGH VALLEY.—See an item in regard to the L. V. Coal Sales Company in General News.

MINNEAPOLIS & ST. LOUIS.—W. M. Wadden, of F. H. Prince & Co., Boston, was elected a director, succeeding Edwin Hawley, deceased, and W. J. Woolman, of J. S. Bache & Co., New York, was elected a director, succeeding F. M. Tompkins, resigned.

MISSOURI, KANSAS & TEXAS.—W. S. Crandall, nephew of the late Edwin Hawley, has been elected a director and a member of the executive committee, succeeding Mr. Hawley, and H. E. Huntington has been elected a director, succeeding H. J. de Marez Oyens, deceased. Mr. Oyens represented Dutch holdings.

PASCAGOULA NORTHERN.—The entire property of this railway and of W. Denny & Co., Moss Point, Miss., consisting of saw mills, mill sites and improvements at Moss Point, is to be sold at public auction at Pascagoula on March 5, 1912. The property will be sold as a whole or in parcels. The road runs from Pascagoula, on the L. & N., to Evanston, on the New Orleans, Mobile & Chicago, 41 miles.

PENNSYLVANIA COMPANY.—A press report from Dayton, Ohio, says that one of the Pennsylvania Lines West has taken over the Dayton, Lebanon & Cincinnati, thus giving the Pennsylvania an additional entrance into Cincinnati.

ST. LOUIS SOUTHWESTERN.—See Stephenville North & South Texas.

STEPHENVILLE NORTH & SOUTH TEXAS.—The Texas Railway Commission has authorized the S. N. & S. T. to issue $2,423,000 first mortgage 5 per cent. bonds, guaranteed by the St. Louis Southwestern, the proceeds to be used to reimburse the company for the cost of building 105 miles of line to connect with the St. Louis Southwestern.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—A. E. Sweet, general manager of the second district of the Chicago, Rock Island & Pacific, has been elected a member of the association, succeeding F. O. Melcher, deceased. The roads represented in this association are as follows: Missouri Pacific; Missouri, Kansas & Texas; Wabash; Cleveland, Cincinnati, Chicago & St. Louis; Louisville & Nashville; Vandalia; Baltimore & Ohio Southwestern; Southern; Chicago & Alton.

WABASH.—The $10,000,000 5 per cent. receivers' certificates which Kuhn, Loeb & Co., New York, bought from the receivers at $1,002.50 per $1,000 bond, are being sold to the public at $1,008.75 per $1,000 bond. It is understood that over 75 per cent. of the total issue has been sold by the bankers.

WELLSBURG & STATE LINE RAILROAD.—The property of this projected and partly built railway and of the Wellsburg Coal Company has been ordered sold to meet the claims of contractors and laborers. The right of way of the railway was abandoned in 1905.

A concession has been obtained to build and operate a railway from the city of Santa Fe, Argentina, to a point on the Bermejo river, within 40 miles of Presidente Roca. The gage will be 3 ft. 1 in.

ANNUAL REPORT

PERE MARQUETTE RAILROAD COMPANY.

Detroit, Mich., October 19, 1911.

To the Stockholders:

The Board of Directors respectfully submit herewith their Report of the operations and affairs of the Pere Marquette Railroad Company for the fiscal year ended June 30, 1911.

MILEAGE.

	June 30, '11.	June 30, '10.	Increase.	Decrease.
Miles of Road Owned	1,804.65	1,807.26		2.61
Miles of Road Controlled	249.96	253.00		3.04
Leased and Trackage Rights	313.40	304.62	8.78	
	2,368.01	2,364.88	3.13	
Less South Haven and Lawton Branch Leased to Kalamazoo, Lake Shore & Chicago Ry.	33.82	33.82		
Less Paw Paw Lake Branch leased to Benton Harbor & St. Joe Railway and Light Co.	2.72	2.72		
Total Mileage Operated	2,331.47	2,328.34	3.13	

The increase of 3.13 miles as compared with June 30, 1910, is made up as follows:

Increase—		
Alexis, O., to Toledo, O., L. S. & M. S. Ry.		8.70
Ann Arbor R. R. tracks at Alexis, Ohio		.09
Romulus, Mich., P. M. R. R. "Y." connection with Wabash R. R.		.06
		8.85
Decrease—		
Stratford Spur Track taken up	3.04	
Wells Spur Track taken up	2.67	
Delray, Mich., to Romulus, Mich., Wabash R. R. Corrected	.01	5.72
Total Increase in mileage operated		3.13

The statistics and tables shown throughout this report include the operations of,

Pere Marquette Railroad Company,
The Lake Erie and Detroit River Railway Company.

REVENUES AND EXPENSES.

Operating Revenues		$16,523,762.24
Operating Expenses	$13,470,965.07	
Taxes	664,770.22	14,135,735.29
		$2,388,026.95
Interest	$3,074,499.96	
Rentals	721,188.07	3,795,688.03
		$1,407,661.08
Other Income	$164,132.55	
Hire of Equipment (Debit)	570,232.50	406,099.95
	Deficit	$1,813,761.03

COMPARATIVE STATEMENT OF REVENUES AND EXPENSES.

For the Fiscal Year ended June 30, 1911, and June 30, 1910.

	1911.	1910.	Increase or Decrease.
Operating Revenues	$16,523,762.24	$16,542,271.49	—$18,509.25
Operating Expenses	13,470,965.07	11,698,842.16	1,772,122.91
Net Operating Revenues	3,052,797.17	4,843,429.33	—1,790,632.16
Taxes	664,770.22	755,641.37	—90,871.15
Net Operating Income	2,388,026.95	4,087,787.96	—1,699,761.01
Other Income	164,132.55	126,393.08	37,739.47
Hire of Equipment....(Debit)	570,232.50	143,213.40	—427,019.10
Total Net Income	1,981,927.00	4,070,967.64	—2,089,040.64
Interest	3,074,499.96	2,924,665.06	149,834.90
Rentals	721,188.07	676,588.89	44,599.18
Total Interest and Rentals	3,795,688.03	3,601,253.95	194,434.08
Surplus	.....	$469,713,69	.....
Deficit	$1,813,761.03	.....	$2,283,474.72

	1911.	1910.	Increase.	Decrease.
Percentage of Expenses to Operating Revenues	81.52	70.72	10.80	
Percentage of Taxes to Operating Revenues	4.02	4.57		.55
Total	85.54	75.29	10.25	

Note.—The Revenues and Expenses covering Outside Operations are included in the figures shown above.

CAPITAL STOCK AND BONDED DEBT.

During the fiscal year ended June 30, 1911, there was no increase in the Capital Stock of the Pere Marquette Railroad Company, but the Bonded Debt was increased $24,186,280.00,—$16,706,000.00 of this additional debt being owned by the Company and under pledge—making net increase of Funded Debt in hands of Public $7,480,280.00, as follows:

Bonds and Equipment Notes Issued:

Pere Marquette 5% Improvement and Refunding General Mortgage Bonds to the amount of $16,000,000.00 were issued March 1st, 1911, and deposited with the Guaranty Trust Co. of New York, Trustee, as collateral securing $8,000,000.00 Five Year 6% Gold Notes		$16,000,000.00
Pere Marquette Five Year 6% Collateral Trust Notes to the amount of $8,000,000.00 were issued under Indenture with Guaranty Trust Co. of New York, Trustee, dated March 1st, 1911, to retire various outstanding obligations, including short term notes, and for additions and betterments, cash payment on new equipment purchased, etc., etc.		8,000,000.00
Pere Marquette 4% Refunding Bonds were issued as follows		706,000.00
In exchange for Robert Winthrop & Co. 4½% Equipment Trust Notes retired in October, 1910, and April, 1911	$152,000.00	
In exchange for Marquette Equipment Company, Ltd., 5% Bonds retired in October, 1909, and October, 1910	88,000.00	
In exchange for Lake Erie & Detroit River Ry. Co. 5% Equipment Bonds retired in September, 1910	8,000.00	
Account of Additions and Betterments during 1909 and 1910	458,000.00	
5% Equipment Notes were issued under agreement between American Locomotive Co. and Pere Marquette Railroad Company, dated July 1st, 1910, covering purchase of 15 Locomotives		177,956.25
5% Equipment Notes were issued under agreement between Pere Marquette Railroad Company and The Equitable Trust Company, New York, dated November 15th, 1910, covering purchase of 10 Locomotives		168,500.00
5% Equipment Notes were issued under Equipment Trust Agreement with the Bankers Trust Company, Trustee, dated April 1st, 1911, covering extension of Pullman Co. 5% Equipment Warrants, Series "A" and "B" for a like amount, secured on 4,000 Box Cars		2,112,000.00
5% Equipment Notes were issued under agreement with Bankers Trust Company, Trustee, dated June 1st, 1911, covering purchase of 50 Locomotives and 14 Passenger Cars		870,000.00
Total Bonds Issued		$28,034,456.25
Less—Improvement and Refunding Bonds issued March 1st, 1911, and pledged as collateral for 5 Year Gold Notes	$16,000,000.00	
Refunding Mortgage 4% Bonds issued during year and pledged with Trustee of Improvement and Refunding General Mortgage of March 1st, 1911	706,000.00	16,706,000.00
		$11,328,456.25

Bonds and Equipment Notes Retired:

Lake Erie & Detroit River Ry. 5% Equipment Bonds retired September 1st, 1910, and March 1st, 1911	$16,000.00	
Marquette Equipment Co. 5% Bonds retired October 1, 1910	89,000.00	
Robt. Winthrop & Co. 4½% Equipment Notes, retired October 1, 1910, and April 1, 1911	152,000.00	
American Car & Foundry Co. 6% Equipment Notes retired October 1, 1910, and April 1, 1911	80,000.00	
Pere Marquette 6% Equipment Gold Notes (Eastern Equipment Co. extension) retired March 1, 1911	650,000.00	
American Locomotive Co. 5% Equipment Notes (Series A) retired July 3, 1910, October 3, 1910, January 3, 1911, and April 3, 1911	40,000.00	
American Locomotive Co. 5% Equipment Notes (Series B) retired October 1, 1910, January 1, 1911, April 1, 1911, and July 1, 1911	57,956.25	
Pullman Co. 5% Equipment Notes (Series A and B) retired by monthly payments during fiscal year, last payment March 15th, 1911	$507,653.68	
Extended under agreement with the Bankers Trust Co. dated April 1, 1911, whereby 5% Equipment Notes maturing semi-annually to April 1, 1919, were issued	2,112,000.00	2,619,653.68
Pullman Co. 5% Equipment Notes (Series C) retired September 15, 1910, December 15, 1910, March 15, 1911, and June 15, 1911	42,042.78	
C. H. & D. Ry. Co. Kleybolte Equipment Notes retired October 1, 1910, and April 1, 1911	68,743.54	
Equitable Trust Co. 5% Equipment Notes retired by monthly payments beginning December 15, 1910	32,780.00	
Total Bonds Retired		3,848,176.25
Increase in Bonded Debt in hands of Public		$7,480,280.00

Payments have been made for sundry equipment obligations, for the purchase of new equipment and for the retirement of short term notes as follows:

Paid Pullman Company for notes maturing during this fiscal year and issued during the Receivership period for the purchase of 4,000 Box Cars.	$507,653.68

Paid The Cincinnati, Hamilton & Dayton Railway Company, on account of equipment purchased under what is known as the Kleybolte Equipment Trust Agreement in 1905 and turned over to the Pere Marquette while that property was under lease to the C. H. & D. This payment was made in accordance with award of arbitrators.		38,743.54
Paid holders of Marquette Equipment Company, Ltd., 5% Bonds, issued October 1, 1900, for the purchase of 17 Locomotives and 1,110 Freight Cars and called for payment October 1, 1910....		89,000.00
Paid holders of Lake Erie & Detroit River Railway 5% Equipment Bonds, issued March 1, 1904, for the purchase of 3 Locomotives and 210 Coal Cars and maturing September 1, 1910, and March 1, 1911		16,000.00
Paid Robert Winthrop & Company, for notes maturing October 1, 1910, and April 1, 1911, and issued October 1, 1904, for the purchase of 20 Locomotives and 2,350 Freight Cars.....		152,000.00
Paid holders of Pere Marquette 6% Equipment Gold Notes, maturing March 1, 1911, which were issued for extension of Eastern Equipment Co. 5% Bonds for like amount covering 65 Locomotives, 4,832 Freight Cars, 1 Wrecking Crane and 3 Car Ferries		650,000.00
Paid American Car & Foundry Company 6% Notes, maturing October 1, 1910, and April 1, 1911, issued August 1, 1908, for the purchase of 750 Gondola Cars		80,000.00
Paid American Locomotive Co. 5% Equipment Notes, Series "A", maturing July 3, 1910, October 3, 1910, January 3, 1911, and April 3, 1911, issued January 3, 1910, for purchase of 12 Locomotives		40,000.00
Paid American Locomotive Co. for 25% of total cost of 15 Locomotives purchased July 1, 1910..	$59,318.75	
For 4% Equipment Notes, Series "B", issued July 1, 1910, for balance of purchase price of said Locomotives and maturing October 1, 1910, January 1, 1911, April 1, 1911, and July 1, 1911...	57,956.25	117,275.00
Paid Pullman Company for 20% of total cost of 20 Passenger Coaches, 8 Baggage Cars and 2 Baggage and Mail Cars purchased June 15, 1910	$58,188.00	
For 5% Equipment Notes, Series "C", issued June 15, 1910, for balance of purchase price of said equipment, and maturing September 15, 1910, December 15, 1910, March 15, 1911, and June 15, 1911	42,042.78	100,230.78
Paid Equitable Trust Co. 5% Equipment Notes maturing monthly, beginning December 15, 1910, issued November 15, 1910, for purchase of 10 Locomotives		32,780.00
Paid Bankers Trust Co. for 15% of total cost of 50 Locomotives and 14 Passenger Cars purchased June 1, 1911		153,913.00
Paid Industrial Iron Works, Bay City, Mich., for 1 Locomotive Crane		5,150.00
Paid McMyler Interstate Co. for 90% of purchase price of one Locomotive Crane		6,300.00
Paid American Shipbuilding Co. for cost of new Steamer No. 18, which was built to replace the No. 18 sunk in Lake Michigan, September 9, 1910	$297,500.00	
Paid to cover cost of furniture and fixtures.....	7,612.64	
	$305,112.64	
Less—Amount received from the Insurance Company covering loss of Steamer 18.....	275,000.00	30,112.64
Paid to retire various short term notes.....		2,500,000.00
		$4,549,158.64

The proceeds of $8,000,000 Pere Marquette five year six per cent. Collateral Trust Indenture Notes dated March 1, 1911, were used in part in making the above payments.

IMPROVEMENTS.

During the fiscal year ended June 30th, 1911, improvements to cost approximately $1,900,000.00 were authorized, as follows:

Double Track.

Alexis to Romulus	36.50 miles
Hoyt to Bridgeport	4.10 "
LaMar to Grandville	2.46 "

The double track from Alexis to Romulus is necessary to take care of the business offering at Toledo.

The double tracks between Hoyt and Bridgeport and between LaMar and Grandville are the entrances to our large yards, the former at Saginaw and the latter at Grand Rapids. These tracks will facilitate the handling of the heavy business at above terminals.

Change of Line.

Alfred to Union Pier..... 5.64 miles

Provision has been made for the construction of a new line from Alfred to Union Pier, a distance of 5.64 miles, which eliminates approximately 360 degrees of curvature and makes a five-tenths instead of a nine-tenths grade line.

Grade Revision and Double Track.

St. Joseph to Riverside..... 7.59 miles

A straight line with five-tenths grade is under construction, northbound out of Benton Harbor. The present line has a nine-tenths grade and heavy curvature. There is also under construction a double track from St. Joseph through Benton Harbor to Riverside, which, when completed, will facilitate the movement of trains through these two important points.

Passing Tracks.

Saginaw District	32 passing tracks	70,873	ft. of track
Grand Rapids "	14 " "	33,840	" " "
Detroit "	11 " "	28,300	" " "

This provision embraces additional passing tracks on the Chicago, Toledo, Grand Rapids, Ludington, Port Huron, Saginaw, Petoskey, S. T. & H., and Port Austin Divisions. These tracks are necessary to properly handle the business on above divisions.

Engine Terminals.

Provision has been made for a new forty-three stall roundhouse complete, at Grand Rapids. The present engine house is inadequate for that purpose, and will be added to the erecting shop, thereby increasing the capacity of the shop 75 per cent.

Twenty stalls are being added to the present twelve-stall roundhouse at Saginaw. This addition will take the place of two small roundhouses which were built prior to 1874 and are not large enough to accommodate the present class of power.

Shops and Machinery.

The construction of the new 43-stall roundhouse at Grand Rapids will enable us to convert the 24-stall longitudinal house, which has been used as a roundhouse, into a boiler, tank and blacksmith shop, thereby increasing the working space in the erecting shop from ten to eighteen stalls, eight of the stalls having been heretofore used for the boiler, tank and blacksmith work.

At Saginaw: The new boiler and tank shop and addition to erecting shop provided for last year are practically completed. A new power-house is under construction and two additional water tube boilers are being installed to complete battery of four boilers to take care of power necessities economically. The boilers now in use are over thirty years old and worn out.

New shop machinery and tools, to cost approximately $63,000.00, have been ordered and are now being installed.

Terminal Yards.

Grand Rapids yard tracks to accommodate 740 additional cars.
Detroit yard tracks to accommodate 500 additional cars.
Ludington yard tracks to accommodate 700 additional cars.
Saginaw yard tracks to accommodate 450 additional cars.
Toledo yard tracks to accommodate 600 additional cars.

The additional yard room at the above points is necessary to accommodate the increased business.

Telephone and Telegraph Lines.

Reconstruction of telegraph line and installing telephone dispatching circuits between:

Detroit and Grand Rapids.
Ludington and Saginaw.
Grand Rapids and Porter.

The reconstruction of our telegraph lines as outlined above and the installation of train dispatching circuit will increase the efficiency of our service and facilitate the movement of trains through the territory above mentioned; this, with the one hundred thirty-five miles of telephone train dispatching circuit already constructed, will give a total of five hundred and sixty-one and fifty-eight hundredths miles of copper wire telephone train dispatching circuit on our main line, as follows:

	Miles	
Saginaw to Ludington	137.60	
Detroit to Grand Rapids	152.00	
Grand Rapids to Porter	136.98	
Saginaw to Toledo	135.00	561.58 miles

New Passenger Stations.

Provision has been made for new passenger stations at Ludington and St. Joseph. Both of these stations are very important from a passenger standpoint. The station at Ludington burned some time ago and has not been repaired. The building at St. Joseph is thirty years old and wholly inadequate.

New Freight Station.

A new freight station is under construction at Saginaw. The present station, constructed in 1869, is too small to properly handle the business at this important point.

ROADWAY AND TRACK.

During the year there were 31.78 miles of side and yard tracks constructed and 8.47 miles of unproductive tracks taken up. A net increase of 23.31 miles.

There were 665,562 cross ties used during the year, 472,322 being used in main track renewals, 101,844 in side track renewals and 91,396 used for new work.

315,124 tie plates were put in.

531 sets of switch ties were used, 240 sets being placed in main track renewals, 112 sets in side track renewals and 179 sets in new work.

78.21 miles of track were ballasted with gravel and cinders.

The grade between Lansing and Trowbridge, 2.08 miles, was reduced to a .5 per cent. grade by cutting down the hill and raising depression at Cedar River.

At Plymouth additions were made to our yard facilities which increased the capacity to accommodate 340 additional cars.

New passing tracks were constructed at Ensel, and between Ann Pere and Howell.

STEEL RAIL.

During the year there were 564,291 track feet of new 75-lb. rail, and 5,280 track feet of new 70-lb. rail laid on Main Line, as follows:

75-lb. rail	Chicago Division	59,616	track feet
	Grand Rapids Division	262,728	" "
	Toledo Division	183,912	" "
	Ludington Division	58,035	" "
		564,291	" "
70-lb. rail	Buffalo Division	5,280	" "
	Total	569,571	" "

The relaying of the above mileage with 75-lb. and 70-lb. rail released 85-lb., 75-lb., 70-lb., 67-lb., 60-lb., 56-lb. and 50-lb. rail, which with 25,343 track feet second-hand rail on hand from last year was used as follows:

RELAID ON MAIN LINE.

Petoskey Division	247,413	track feet
Chicago Division	6,640	" "
Muskegon Division	142,080	" "
Detroit Division	3,960	" "
Toledo Division	86,302	" "
Saginaw Division	2,116	" "
Ludington Division	6,694	" "
S. T. & H. Division	77,205	" "
Kalkaska Branch	5,280	" "
Almont Branch	12,667	" "
	590,357	" "
Relay rail laid	590,357	track feet
New rail laid	569,571	" "
Used in side tracks	4,557	" "

FENCES.

During the year there were 1.24 miles new fence built, 131.06 miles rebuilt and 109.54 miles repaired.

TELEGRAPH DEPARTMENT.

During the year 19.88 miles of telegraph line were reconstructed, and telephone dispatching circuit between Saginaw and Toledo (274.00 miles of copper wire) was installed and 35 stations equipped with telephones.

BRIDGES AND CULVERTS.

New steel bridges on concrete abutments and piers were constructed at Hartford, Jenison, Sparta, Lansing, Berkshire, Greenville, Mayville, Northville, Mich., Leamington, New Canaan and Whitebread, Ont., replacing wooden structures.

Wooden overhead bridge at Leamington, Ont., has been replaced by steel bridge on pile foundations. One hundred foot wood truss bridge at Memphis, Mich., has been replaced by steel truss bridge on pile foundations.

Twenty-five concrete culverts were constructed, replacing wooden, cast iron pipe and open culverts.

Wooden bridges were constructed on Branch lines at Barryton, Grawn, Canton, Harbor Beach, Port Austin and Ubly, Mich., replacing bridges destroyed by fire and washouts. Seven small wooden pile bridges were renewed, account age.

Extensive repairs were made to bridges at Northville, Plymouth, Reed City, Saginaw and What Cheer, Mich., and Wallaceburg, Ont.

Wooden bridge at Michigan City, Ind., was replaced by double box culvert.

One hundred and three cast iron pipe culverts were put in during the year and twenty cast iron pipe culverts were extended.

BUILDINGS, FUEL AND WATER STATIONS.

A new brick pump house was erected at Plaster Creek to supply Wyoming shops with water.

New freight houses were erected at North Grand Rapids and at Godfrey Avenue, Grand Rapids.

Freight house at Detroit extended 105 feet. (Steel structure on concrete foundation with corrugated iron siding).

New depot constructed at Watson, Ont.

New frame freight and transfer house (joint with D. T. & I.) was constructed at Carleton, Mich.

At Plymouth, new yard office and engine house were constructed, also new turn-table and cinder pit installed.

Extensive repairs were made to 17th street engine house, Detroit.

At Saginaw an addition of 100 x 100 feet was made to machine shop; new boiler shop (100 x 58 feet) and new boiler house were erected; two 250 H. P. boilers were installed, transfer table was extended and new office, tool room and toilet rooms for machine shop and new frame office and oil house for engine house were constructed.

New 50 foot, 100 ton track scale installed at Ionia.

New water tanks were erected at following points: Fairgrove, Howard City, Ludington, New Boston, Yale and Zion, Mich.

New wells for water supply were installed at Bay Port, Elkton and Zion, Mich., and reservoir built at Edmore, Mich.

EQUIPMENT.

During the year contracts were let for the construction of:

10 consolidation freight engines, cylinders 22 x 30, weight on drivers 193,500 pounds.
10 consolidation freight engines, cylinders 22 x 30, weight on drivers 193,500 pounds.
25 consolidation freight engines, cylinders 25 x 30, weight on drivers 210,500 pounds, equipped with superheaters and Franklin doors.
10 switch engines, cylinders 20 x 26, weight on drivers 134,500 pounds.
5 Pacific type passenger engines, cylinders 22 x 28, weight on drivers 139,500 pounds, equipped with superheaters and Franklin doors.
12 first-class coaches.
2 combination baggage and mail cars.

Of the above, the first ten consolidation freight engines, cylinder 22 x 30, were received in December, 1910.

The ten switch engines, five Pacific type passenger engines, eleven first-class coaches and two combination baggage and mail cars, were received during June, 1911.

The remainder of the equipment (35 consolidation freight engines and one first-class coach) to be delivered during the months of July and August, 1911.

There were also purchased during the year one locomotive coaling crane and one locomotive crane equipped with forty-three inch lifting magnet for use in handling heavy materials.

Nine eight-wheel engines and two small switch engines were scrapped during the year on account of their age and being too light to justify extensive repairs.

During the year there were received on contract previously let, seven first-class coaches, eight baggage cars and two combination baggage and mail cars; three first-class coaches were built at Ionia shop to replace cars of the same class burned at the time of Muskegon shop fire, June 20th, 1909.

The old parlor cars were converted into coaches on account of not being suitable for further use as parlor cars, and three second-class coaches and two baggage cars were destroyed by fire or accidents.

Ten box cars were converted into cabooses and nine box, three flat and three coal cars converted into work service cars. Seventy-eight box, three stock, twenty coal, thirty flat, four caboose and two work service cars were destroyed by fire or accident on lines of this Company or on foreign lines. Twenty-three box, ten flat and seven work cars were retired from service during the year on account of age and being of too small capacity to justify extensive repairs necessary to put them in serviceable condition.

SUMMARY OF CHARGES AND CREDITS TO ADDITIONS AND BETTERMENTS DURING FISCAL YEAR ENDED JUNE 30, 1911.

Description.	Debits.	Credits.	Net.
Right of Way and Station Grounds	$54,743.68	$600.00	$54,143.68
Real Estate		350.00	350.00 Cr.
Widening Cuts and Fills	3,299.37		3,299.37
Grade Reductions and Changes of Line	47,766.65	18,700.00	29,066.65
Bridges, Trestles and Culverts	92,571.63	23,481.25	69,090.38
Increased Weight of Rail	57,657.07		57,657.07
Improved Frogs and Switches	879.24		879.24
Track Fastenings and Appurtenances	35,846.92		35,846.92
Additional Main Tracks	52,681.58		52,681.58
Sidings and Spur Tracks	103,505.39	56,287.53	47,217.86
Terminal Yards	155,003.91	1.590.00	153,413.91
Fencing Right of Way	839.55		839.55
Improvement of Crossings Under or Over Grade	5,414.86		5,414.86
Interlocking Apparatus	7,023.85		7,023.85
Block and Other Signal Apparatus	706.98	975.00	268.02 Cr.
Telegraph and Telephone Lines	13,489.42		13,489.42
Station Buildings and Fixtures	22,251.19	8,371.29	13,879.90
Roadway Machinery and Tools	2,887.25		2,887.25
Shops, Engine Houses and Turntables	145,538.83	8,395.34	137,143.49
Shop Machinery and Tools	36,894.26	250.00	36,644.26
Water and Fuel Stations	22,137.23	13,100.00	9,037.23
Dock and Wharf Property		250.00	250.00 Cr.
Electric Light and Power Plants	1,100.22		1,100.22
Equipment	877,170.49	711,529.02	165,641.47
Interest and Commissions	1,522.64		1,522.64
Other Additions and Betterments	2,344.63	4,150.00	1,805.37 Cr.
Total	$1,743,276.84	$848,029.43	$895,247.41

The gross revenues of the Pere Marquette Railroad Company for the fiscal year ended June 30, 1911, were $16,523,762.24, a decrease of $18,509.25 as compared with the gross revenues of preceding year.

Of the loss in revenues during the year, $365,530.37 was in freight traffic, with a decreased tonnage carried of 180,979 tons, and a decrease of 26,232,324 tons carried one mile. The average rate per ton per mile was .579 cents, as compared with .591 cents in 1910. The most important losses in freight traffic can be accounted for by decreased shipments of the following commodities: Bituminous Coal, 139,002 tons; Corn, 36,120 tons; Hay, 21,570 tons; Fruits and Vegetables, 67,859 tons; Dressed Meats, 33,438 tons; Plaster, 23,076 tons; Lumber, Lath and Shingles, 29,209 tons; Staves, Headings and Hoops, 22,737 tons; Logs, 35,052 tons; Other Iron and Steel Products, 55,728 tons; Bar and Sheet Metal, 31,714 tons; Merchandise, 96,991 tons. The principal increase in tonnage carried was as follows: Oats, 99,542 tons; Potatoes, 98,270 tons; Sugar Beets, 93,374 tons; Anthracite Coal, 139,991 tons; Stone, Sand, etc., 48,913 tons; Miscellaneous Carload Shipments, 21,728 tons. The statement of commodities carried, page 27, shows the above and other fluctuations in the various commodities.

The passenger revenues show an increase of $232,079.56, with an average rate per passenger per mile of 1.774 cents, as against 1.770 cents in 1910. The number of passengers carried increased 111,829. The increase in the number of passengers carried one mile was 12,591,981. This represents an increase in passengers carried one mile over the preceding year of 6.01%, which is slightly less than the normal increase per year during the past ten years. This increase is largely accounted for by additional passenger trains being placed in service on our main lines, which increased our total passenger train mileage 164,265 miles, or 4.02% as compared with year ending June 30, 1910.

The Michigan two cent fare law (effective September 28th, 1907) continues to be a serious handicap to the profitable operation of passenger service on a very considerable portion of our mileage. The passenger train mileage for the year was 4,248,371 miles; of this 2,484,284, or 58.48%, was mileage of main line trains and 1,764,087, or 41.52%, was mileage of branch line trains. The approximate passenger revenue per train mile on the branch lines was 49 cents. The increase of $232,079.56 in the gross passenger revenues for the year was contributed entirely by the main line trains, and this increase is very largely accounted for by the fact of our having added 230,844 additional main line passenger train miles. At the time this legislation was under discussion, its advocates claimed that two cent fares would be very profitable to the railroads on account of the stimulating effect it would have on travel. Our experience shows conclusively that it has not stimulated travel in the thinly settled districts of Michigan, and that the operation of this law is a serious burden to the Pere Marquette Railroad Company on account of being required to operate a large percentage of its passenger train mileage at a loss.

The revenues from outside operations decreased $9,694.48. The revenue from express traffic increased $83,570.89, and the mail revenue increased $596.21.

The expenses of operation show increases aggregating $1,772,122.91, of which amount $190,859.12 was in maintenance of way and structures; $433,159.53 in maintenance of equipment; $47,491.58 in traffic expenses; $921,460.06 in transportation expenses; $62,199.31 in general expenses and $116,953.31 in outside operations. The percentage of expenses to gross revenues was 81.52%, as against 70.72% in 1910, an increase of 10.80%. The distribution of operating expenses, found on pages 25 and 26, sets forth the comparative increases and decreases in the several accounts.

The taxes for the year were $664,770.22, as comared with $755,641.37 paid in 1910, a decrease of $90,871.15.

The general income account of the Company shows a deficit for the year of $1,813,761.03, as against a surplus of $469,713.69 for 1910.

The charges to operating expenses, as per tabulated statements on pages 25 and 26, have been made in accordance with classification of expenses adopted by Interstate Commerce Commission, which provides for maintenance and operation only, and does not permit of any charge that is in the nature of an addition or betterment to the property, such charges being provided for under their classification of additions and betterments, as shown on page 12 of this report. The general balance sheet on page 19 is also in the form prescribed by the Commission.

The Profit and Loss debit as of June 30, 1910, was $156,456.56. This account was debited during the year with $515,778.84 account of charges for discounts on bonds sold; $286,705.32 account of depreciation prior to July 1, 1907, on equipment, tracks and structures destroyed, removed or sold; $16,192.27 account of sundry adjustments during the year, and the balance from income account of $1,813,761.03. The account was credited during the year with $8,581.35, leaving the debit to Profit and Loss account June 30, 1911, $2,780,312.67.

By order of the Board of Directors.
WILLIAM COTTER,
President.